

ROADS *and* STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

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UNIVERSITY MICROFILMS



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Jumbo Job "Spread Out for 60 Miles" . . . page 55

AGC Leaders Ask Chance to Be Efficient . . . page 66

Highway Consultants: Their Growing Role . . . page 164

April 1958



WAYNE EXECUTIVES (left to right): A. W. Carlson, Production Control Manager; Darrel Vincent, Ass't Chief Engineer; Robert Peddicord, Director of Purchases. Kermit Warn (in cab), Experimental Supervisor.

why Wayne Sweepers power with Chrysler Industrial Engines

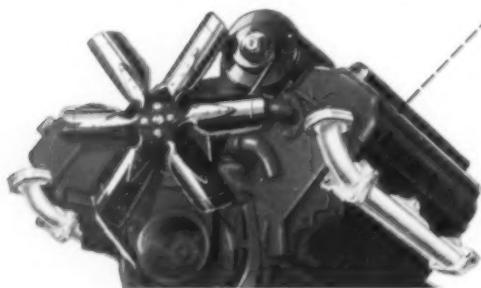
Wayne sweepers are designed and built for heavy-duty municipal and industrial sweeping. It's tough, dirty work that requires rugged, yet economical power. Wayne Manufacturing Company has found Chrysler Industrial Engines stand up under these demands exceptionally well. Chrysler's oil bath air cleaner protects the engine's working parts in the most extreme dust and dirt conditions. Even at continuous low, lugging speeds Chrysler engines operate coolly, efficiently, economically.

Equally important, manufacturing and purchasing operations are simplified by using Chrysler Power. Engine, transmission and differential are ordered and delivered as a package. Finally, Chrysler Power helps sales because Wayne customers know and respect the reputation of Chrysler Industrial Engines.



CHRYSLER V-8 INDUSTRIAL ENGINE (rear mounted) powers the Wayne Model 550, four-cubic-yard sweeper (shown). Chrysler Ind. 32 (six-cylinder) Engine powers the Wayne Model 450, three-cubic-yard sweeper.

Send for 1958 Chrysler Industrial Engine Catalog:
Dept. G4, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.



... for more details circle 257 on enclosed return postal card

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION



Two men carry this 14-ft., 18-in. diam Beth-Cu-Loy pipe which weighs only 214 lb.

Advantages of light-weight Beth-Cu-Loy culverts

Galvanized Beth-Cu-Loy culvert sheets, being made of steel, have great strength in proportion to weight. This strength is substantially increased by corrugation. That's why it's possible for a Beth-Cu-Loy culvert to have both thin walls and plenty of rugged strength.

Because of these thin walls, a pipe or culvert made of Beth-Cu-Loy sheets weighs considerably less per foot than other types of drainage structures. It is easier to handle, cheaper to ship, can be lifted, unloaded and laid with ordinary roadbuilding equipment. Long pipe lengths are feasible, reducing the number of field joints.

Light weight is a big reason for the growing popularity of corrugated Beth-Cu-Loy culvert sheets for drainage pipe. There are other advantages, too: flexibility, minimum trenching, easy coupling, speedy installation and long service life.

Bethlehem manufactures these sheets for use by fabricators of culverts and drainage pipe. If you would like the names of those who can supply pipe made from Beth-Cu-Loy sheets, just call the nearest Bethlehem office.



Beth-Cu-Loy pipe of varying diameters can be nested for shipping, greatly reducing haulage costs per foot.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation, Export
Distributor: Bethlehem Steel Export Corporation



BETHLEHEM STEEL

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ROADS AND STREETS

A GILLETTE PUBLICATION

APRIL, 1958

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NUMBER 4

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ROAD-BUILDING VETERAN PROVES
BEST EQUIPMENT, WELL MAINTAINED, PAYS OFF BEST



GOODYEAR
IS THERE!

▲ MILLION-DOLLAR ARRAY of equipment like this takes \$7,000,000 relocation job on U. S. 21 in stride. This is just one of the many highway and airport grading and paving projects in Frank Mashuda Company's long and successful history. Tires shown are wide-base 3-T Nylon Hard Rock Lug by Goodyear.

◀ TYPICAL ON-JOB SETUP includes huge Quonset maintenance center and 2-way radio facilities. All vehicles and tires are kept in A-1 working condition at all times, on every job—and when no longer needed are returned to central maintenance center for general inspection and reconditioning. This has paid off, through the years, in one of the lowest down-time overheads in the industry.

Tires move more yards for less when built with **Triple-Tough 3-T Nylon Cord!**

ALL 3-T NYLON CORD—Tubeless or Tube-Type



HARD ROCK
LUG



SURE-GRIP
LUG



ALL-WEATHER
EARTHMOVER



Like steel, tire cord must be tempered to be tough. Goodyear's exclusive 3-T process, involving Tension, Temperature and Time, triple-temper cord to make it TRIPLE-TOUGH—to give you longer tire life, lower cost-per-mile.

Known as "the greatest tire SAVER in 23 years," Triple-Tough 3-T Nylon Cord is a Goodyear exclusive.

During years of use, on the toughest jobs on earth, Goodyear 3-T Nylon Cord tires have literally saved millions for contractors and truckers who realize that the final cost of any tire depends entirely on *what they get out of it*.

The fact that more tons are hauled on Goodyear tires than on any other kind, certainly suggests that most operators get more yards-per-dollar, more miles-per-dollar, on Goodyears. If you're not already using Goodyear 3-T Nylon tires on your equipment, try them! Goodyear, Truck Tire Dept., Akron 16, Ohio.

Buy and Specify

GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

All-Weather, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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for **EFFECTIVE** joint sealing



HOT POURED **PARA-PLASTIC®**

Para-Plastic is the *original* hot poured rubberized asphalt joint sealing compound that forms a resilient, adhesive and effective seal which maintains bond at sub-zero temperatures. Unaffected by extremes of temperature, Para-Plastic insures a moisture-tight seal of expansion, contraction and dummy joints in concrete pavement of all types. Para-Plastic JF is a special hot poured rubberized thermoplastic compound especially developed for sealing joints in pavement where they would be affected by spillage of jet fuel or other petroleum solvents used by aircraft.

Drawings at right illustrate sealing characteristics of Para-Plastic Joint Sealer during extremes of temperatures.

COLD APPLIED **ZERO-LASTIC®**

Cold-Applied Zero-Lastic is available in two types: 1. Ready mixed regular Zero-Lastic designed for sealing narrow joints ($\frac{1}{8}$ " and $\frac{3}{16}$ " wide) in concrete pavement where application of other types of material would be difficult without special equipment, and 2. Zero-Lastic JF a two-component jet fuel resistant sealing compound which sets up into a resilient rubber-like seal which is resistant to damage from petroleum solvents, for sealing joints in airfield aprons and other concrete pavement used by aircraft. Applied with pressure application equipment.

Complete details are contained in the Servicised Catalog.
Write for your copy today.



SERVICISED PRODUCTS
CORPORATION

6051 WEST 65TH STREET • CHICAGO 38, ILLINOIS

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ROADS AND STREETS

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Cut fuel bills up to 50% with International® 350 DIESEL POWER

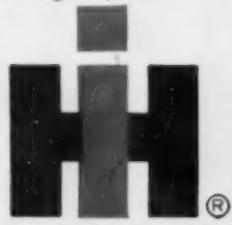
When your jobs call for a tractor to go...go...go day in and day out, all season long, you can make a big cut in fuel costs with an International 350 Diesel. That's because diesel fuel costs less and you use less of it. Lower fuel consumption is especially noticeable on jobs involving intermittent and part-load operation—such as loader work, and trenching or excavating with a backhoe.

And it's a BIG tractor! 49 engine hp delivers over 5,800 pounds pull at the drawbar, or similar push for dozing. There's up to 1,000 pounds greater built-in weight than usual to tractors of this power class. This greater strength means *stamina* to stay on the job in the most rugged service. Power steering is available optionally to give you top driving ease.

International tractors are available with
unit-matched International Pippin and International
Wagner loaders and backhoes.

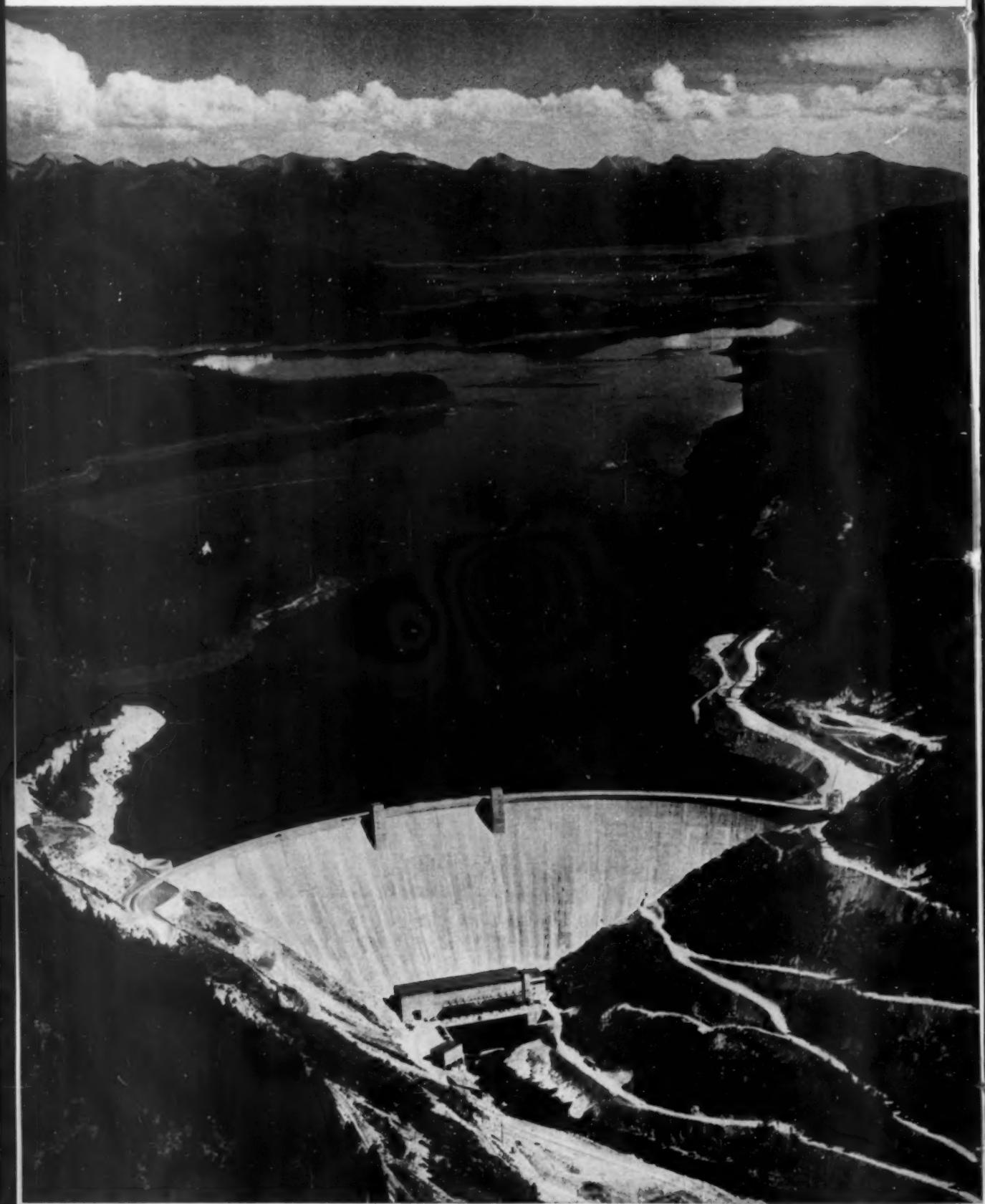
Proof on the job! Ask your IH Dealer to demonstrate. Hold your watch on a measured amount of fuel in the tank, see how an International 350 Diesel can cut your tractor operating costs. For catalog, write International Harvester Company, Dept. RS-4, P. O. Box 7333, Chicago 80, Ill.

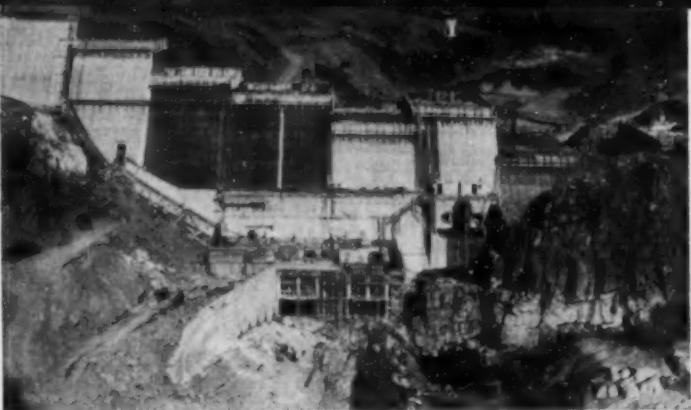
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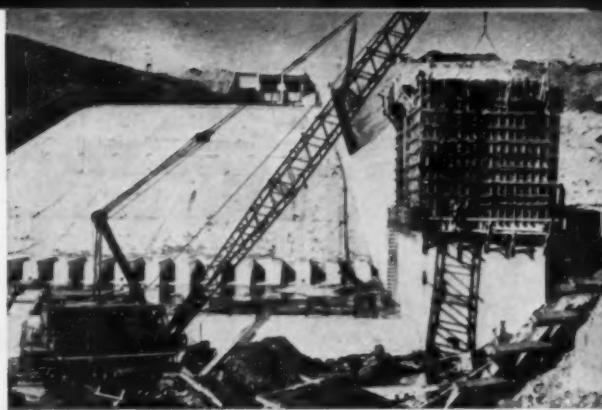
International Harvester Products pay for themselves in use—Farm Tractors and Equipment...Twine...Commercial Wheel Tractors...Motor Trucks...Construction Equipment—General Office, Chicago 1, Illinois

HUNGRY HORSE DAM, MONTANA. TEXACO PLAN PLAYED VITAL PART IN ON-TIME PROJECT COMPLETION.





TEXACO PLAN was used from the start in construction of the Tiber Dam on Montana's Marias River. Dam is 205 feet high and 4,300 feet long.



TIME AND CONFUSION SAVED by Texaco Plan kept maintenance costs low during construction of Tullioch Dam in California.

These 5 great American construction projects use Texaco Simplified Lubrication Plan

These five projects represent hundreds of millions of dollars in construction costs. When you hit these figures, lubrication can be an especially big item. But on any size job, it's not the cost of the lubricants themselves but the difference between *planned* and haphazard lubrication methods that counts. The latter can cause unexpected breakdowns, costly overtime, and ruined equipment. But planned lubrication can speed project completion, minimize downtime, lengthen equipment life. That's why cost-conscious contractors are turning to Texaco's Simplified Lubrication Plan.

TEXACO PLAN SAVED THOUSANDS OF DOLLARS on these jobs. And it can do the same for you. It cuts the number of lubricants you need for all your major lubrication down to no more than six, and it helps you set up an efficient lubricating system for all your equipment. Furthermore, your Texaco Lubrication Engineer will gear the Texaco Plan to your particular requirements.

GET THE WHOLE STORY. Contact your nearest Texaco Lubrication Engineer soon. He can show you how much the Texaco Simplified Lubrication Plan has saved contractors in the past—how it can help you in the future. Just call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

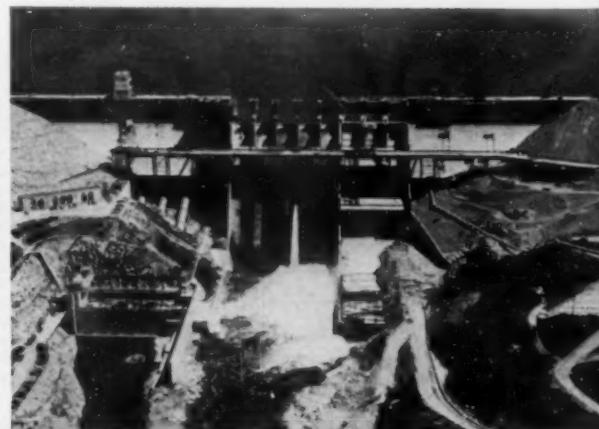


LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



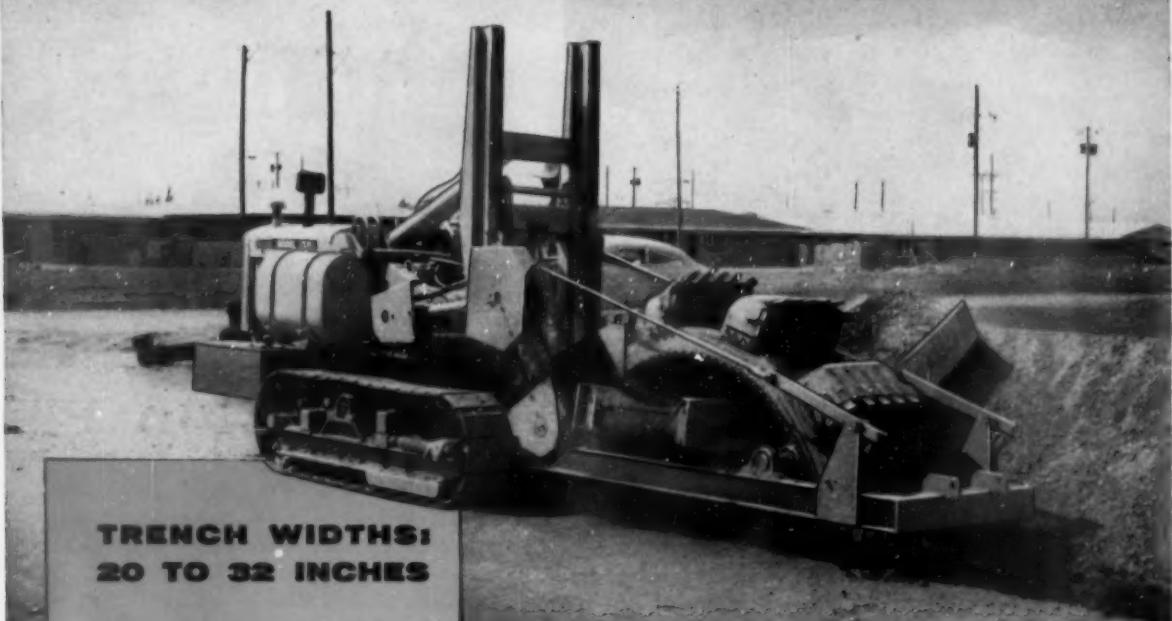
WELL AHEAD OF SCHEDULE, Columbia River's Priest Rapids Dam is already more than one-third complete. Texaco lubricants are used exclusively.



WORLD'S LARGEST earthfill and concrete project, Folsom Dam on the American River, used the Texaco Simplified Lubrication Plan from start to finish.

... for more details circle 332 on enclosed return postal card

PARSONS® 170 WIDE-WHEEL TRENCHLINER®



TRENCH WIDTHS: 20 TO 32 INCHES

- maximum digging depth 5'9"
- hydraulically-driven conveyor — belt speeds independent of digging wheel speeds
- 30 digging speeds from 12" to 25 lineal feet per minute
- heavy-duty cast-steel buckets
- double-point "Tap-In" teeth — self-sharpening, reversible
- quick-change gumbo buckets
- retractable bucket-cleaner
- hydraulic wheel-hoist on power-tilt mast
- standard tractor crawlers — 16" grouser-type treads, or 12" flat shoes optional
- choice of gas or diesel power
- gears enclosed in oil; shafts on antifriction bearings

Want more facts? -----

Mail to: PARSONS Company, Newton, Iowa
Send literature on: ■ 170 ■ 155 Trenchliner

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____
STATE _____

POSTAGE



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10

Developed to meet the demand for wide work range in a medium-size machine, Parsons 170 wheel-type Trenchliner digs up to 32 inches wide, at depths to 5½ feet. With this extra capacity, you get smooth, positive wheel control. Hydraulic power raises and lowers the wheel on vertical mast with fractional-inch accuracy — maintains close grade tolerance on drainage, pipeline, utility trenching — and highway widening. Mast tilts for traveling. Hydraulic control system on conveyor gives belt speeds up to 600 feet per minute — *completely independent of digging wheel speeds*. Belt easily handles maximum yardages from the extra-wide wheel — puts spoil bank well back beyond edge of trench. To suit various digging conditions, the 170 has round or square-bottom buckets with "Tap-In" teeth — solid or tine backs — also, quick-change gumbo buckets. Have Parsons distributor demonstrate what this 170 Trenchliner will do! Call him today.

10 SIZES! For any size trench, from small residential service connections to biggest storm sewers, water and gas mains, check Parsons line. There are 10 different models to choose from: 5 wheel-types — digging 12 to 52 inches wide, at depths to 8½ feet. 5 ladder-types — digging 6 to 72 inches wide, at depths to 19 feet. One of the small ladder-type Trenchliners — model 155 — shown at right.

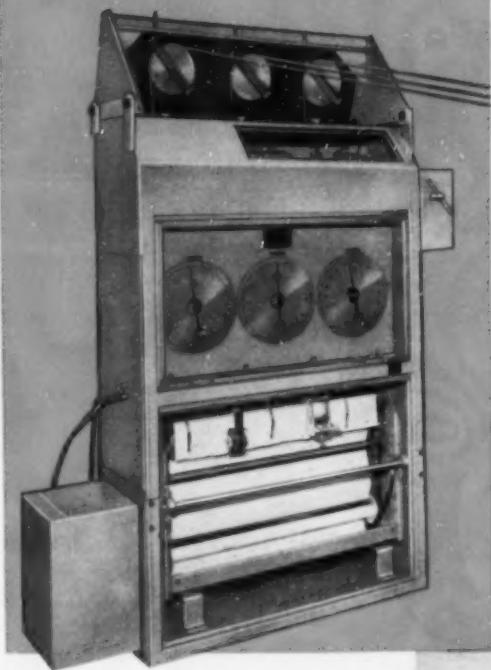


A division of
Kochring Company

PARSONS® TRENCHLINER

ROADS AND STREETS, April, 1958

Johnson® fully-automatic plants make a graphic record of every batch



Automatic one-stop plant →

Owner of this Johnson batch plant used it to supply two 34-E pavers on a big airbase, and next on this turnpike job. During peak operation it weighed out 1.38 cu. yds. (5 materials per batch) every 20 seconds! Johnson automatic plants are available in all sizes, types, with any arrangement of single-material batchers, for one, two, or three-stop charging. Want all the facts? Contact your Johnson distributor, or send for latest catalog shown below.

You're always sure of correct batch-weight — and record — with Johnson automatic plants and pen-recording. There is *direct transmission* of weight from each aggregate and cement batcher to individual dial scale on the control cabinet (left). All materials are recorded on *one* roll — pen lines *tell at a glance* that all mixes are correct, as specified. Each time a batch is discharged, the year, month, day, hour, and *nearest minute* are automatically stamped on the chart. A separate stamp registers batch-sequence number — positively identifies each batch for a complete, *permanent* record. Johnson system also has a moisture-compensating beam which automatically shows dry weight on sand dial — also can be used for all aggregates.

Plant is push-button operated from the batch control unit. Just a turn of the selector knob changes mix on *all* batchers simultaneously. While 7 or 12 different mix selections are usually sufficient for paving, Johnson batch controller can be arranged for 120 mix selections (and "repeater" for automatic re-batching) in big dam and ready-mix plants.



36-page text-book catalog covers all phases of concrete plant operation on highway and airport paving. It features: theoretical plant and paver production tables • formula for estimating truck requirements • plan-views of plant sites • pictorial "tours" through 1, 2, 3-stop plants • latest developments in plant automation • graphic weight-recording systems • comprehensive bin-selection guide. Other sections discuss cement storage, aggregate-handling systems. It's yours for the asking. Fill out coupon and mail today.

Mail to: C. S. JOHNSON COMPANY, Champaign, Illinois
Send free 36-page catalog on "Concrete Paving Plants".

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COMPANY _____

STREET _____

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C. S. JOHNSON CO., CHAMPAIGN, ILL. • STOCKTON, CALIF.

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Just out! The newest in pickups!



NEW FLEETSIDE

Here's the new sweetheart of the Task-Force fleet, Chevrolet's new Fleetside pickup! No truck has ever been better to look at . . . or better for your business.

Long, sweeping lines, graceful body contours . . . new truck appearance that's fleet, dashing and completely modern! Yet there's even more to the new Chevrolet Fleetside than the striking beauty that first meets your eye. There's size, for instance: extra room inside to pack many additional cubic feet of

payload. In lengths of either 78 inches or 98* inches and a full six feet in width, this new body actually provides 50% more cubic capacity than the conventional pickup box!

And with an extra-sturdy build—the result of features like double-walled lower side panels, durable hardwood floor and solidly constructed full-width tailgate—the new Fleetside is the toughest of pickup bodies, made to stand up under a steady pounding. A new adjustable latch keeps gaitight tailgate free from rattles.

Here's a new high in hard-working utility matched by styling that stands out on any street and speaks volumes about both you and your business. See and try the latest in pickups, the new Chevrolet



CHEVROLET

ROADS AND STREETS, April, 1958



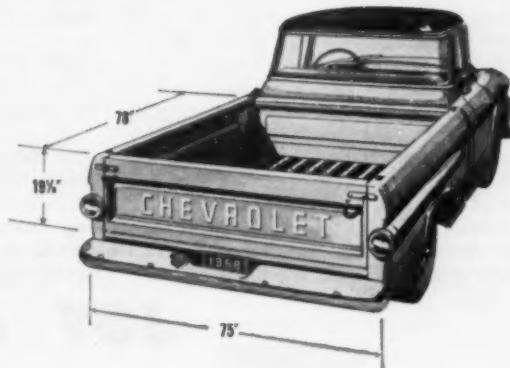
BY CHEVROLET

Fleetside, at your Chevrolet dealer's now! . . .
Chevrolet Division of General Motors, Detroit 2,
Michigan.

*Optional at extra cost.

More load space than any other comparable low-priced pickup. Up to 75.6 cubic feet of load space to pack bigger cargoes and help you get more done each day. The new Fleetside body is so wide you can haul standard 4' x 8' sheets of building material and still have room along the sides for extra items of payload!

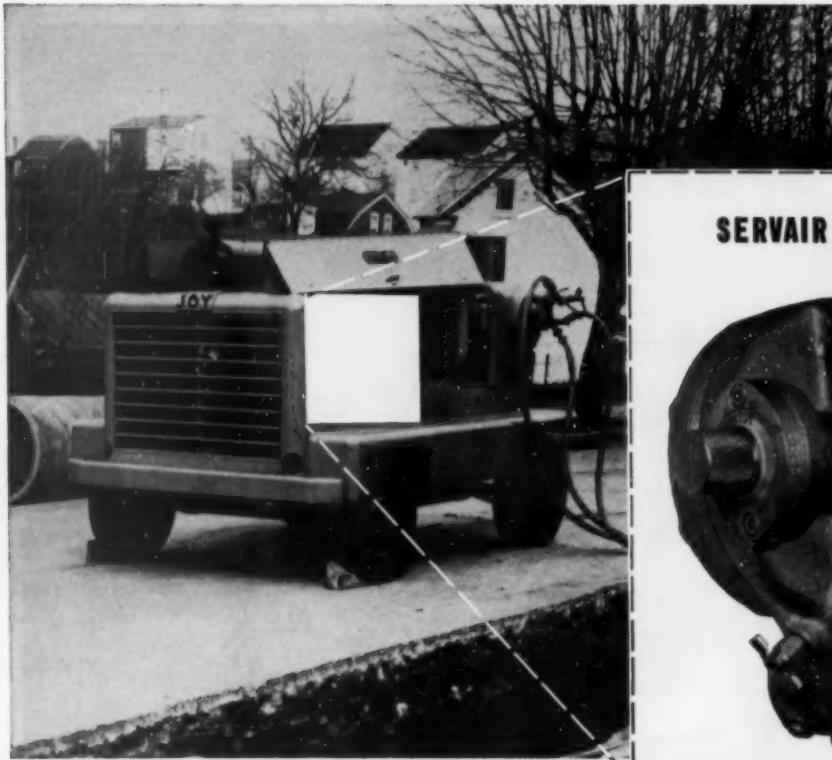
Plenty of work-whipping hustle and muscle. Your choice of two great engines that know how to save—standard 145-h.p. Thriftmaster 6 or optional at extra cost 160-h.p. Trademaster V8. And Fleetside chassis components are truck-engineered down to the last bolt; they'll take all the abuse your most bruising hauls can give them!



TASK- FORCE TRUCKS

... for more details circle 280 on enclosed return postal card

ROADS AND STREETS, April, 1958



SERVAIR DEMAND CONTROL



ONLY JOY **AIRVANE** PORTABLE COMPRESSORS HAVE THIS NEW FOOL-PROOF LOAD CONTROL

The new Servair Demand Control takes the mystery out of pressure setting . . . makes it as simple as turning up the furnace thermostat at home. You just set the dial for the pressure you need and the Joy Airvane Rotary will deliver it.

The Servair is a true "demand" load control because it matches compressor output to demand . . . from 0% to 100% capacity. The control maintains steady air pressure regardless of the number and size of tools cutting in and out during operation, yet runs the engine only fast enough to meet the demand for air. This gives you top fuel economy and a minimum of wear and tear on the engine and compressor.

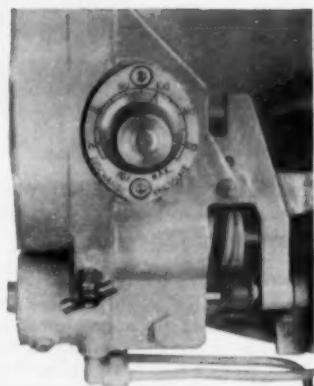
Joy Airvane Rotaries have many other features that make them trouble-free:

THERMAL BY-PASS—an exclusive oil circulating system that provides immediate lubrication and temperature control under all weather conditions.

DIRECT DRIVE—efficient spline coupling eliminates clutch (and clutch maintenance).

READY ACCESSIBILITY—to controls and items normally requiring regular maintenance.

You should get the whole story on Joy Airvane Portables before you consider any new compressor. Write **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**



"JUST SET THE DIAL FOR THE PRESSURE YOU NEED"

JOY . . . EQUIPMENT FOR CONSTRUCTION . . . FOR ALL INDUSTRY



WRITE FOR
FREE BULLETIN
181-86

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Portable Air
Compressors



Wagon
Drills



Rock
Bits



Hand-Held
Rock Drills



ALL OPERATIONS ARE COMPLETELY INDEPENDENT—In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while travelling. Whether to save time or

to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

Getting 9 hours' output in 8

Independent-Swing-and-Travel is available on 11 Link-Belt Speeder models. Eliminates shifting . . . saves 20-30 seconds each move

Link-Belt Speeder users are setting new high-production standards by equipping their machines with *Independent-Swing-and-Travel*. Why? It eliminates time losses ordinarily occurring when the operator shifts from swing to travel and from travel to swing. With *Independent-Travel* shifts are eliminated and the machine can swing and travel simultaneously . . . you can jockey the boom around obstacles in tight quarters, move away from bank cave-ins in split seconds!

If you'd like complete details, proof that *Independent-Travel* can up output . . . cut maintenance and spare parts costs, too — see your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.



MORE USABLE HORSEPOWER — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.

14.104-A

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

... for more details circle 304 on enclosed return postal card

All New



Specify Generals on
your new equipment

From Bead to Tread!

THE GREAT NEW, WIDE-BASE

GENERAL



Offering unsurpassed traction, flotation
and job-hazard protection!

Combining a far deeper, wider and huskier tread with exclusive Nygen Cord construction, the all-new General LCM promises, and produces, ever-lower tire operating costs. Engineered to provide traction and flotation beyond all comparison, the General LCM minimizes rolling resist-

ance, powers through the toughest going to get the job done faster. Built to shrug off costly snags, cuts, and bruises, the General LCM is the toughest, brawniet workhorse tire in the field. One demonstration will convince you of its tremendous power and capabilities.

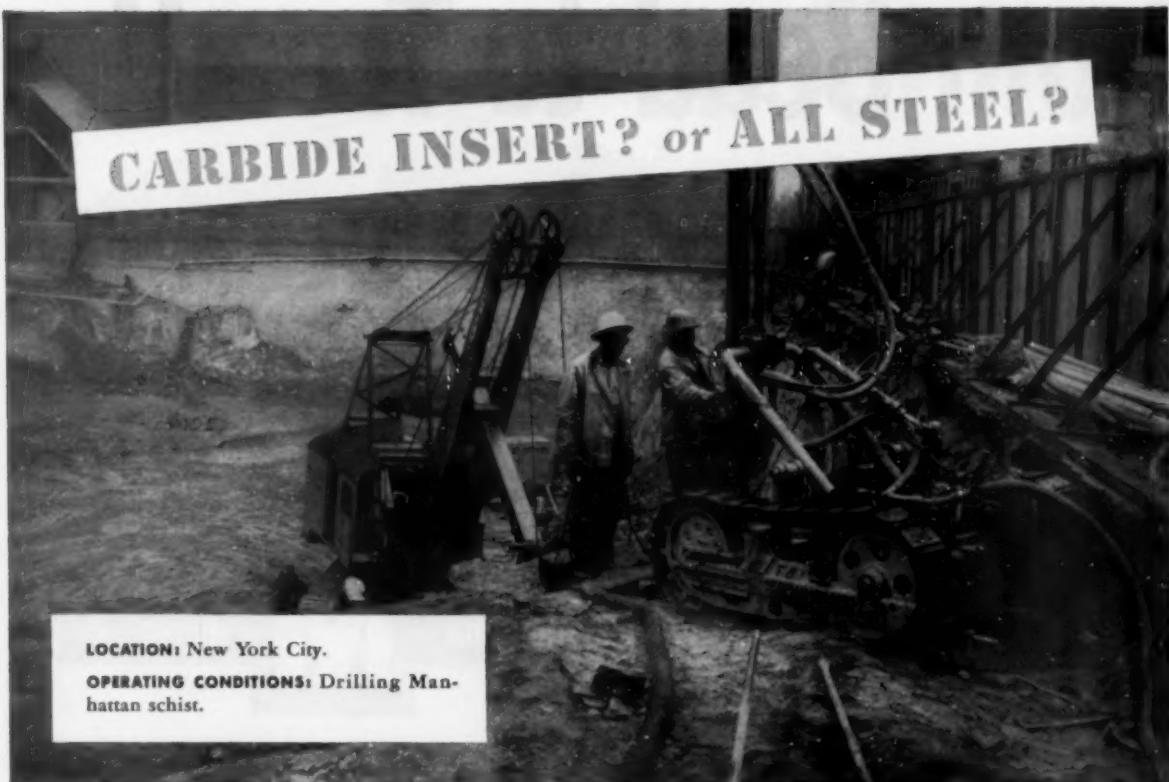
**Test it on your toughest job and watch it
out-perform anything on wheels!**

THE GENERAL TIRE & RUBBER CO.

AKRON, OHIO

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ROADS AND STREETS, April, 1958



"We get faster drilling with fewer bit changes using **TIMKEN®** carbide insert bits"

... Reports Slattery Contracting Co., Inc.

EXCAVATING for the new TIME-LIFE Building in New York City, Slattery Contracting Company, Inc., had to drill extremely deep, constant gage holes through hard, abrasive Manhattan schist. They held bit changes to a minimum, stepped up drilling speed and got lowest cost per foot-of-hole with Timken® threaded carbide insert bits.

For jobs like this you'll find that Timken carbide insert bits give maximum speed and economy.

Yet carbide insert bits aren't always best for every drilling job. In softer, less abrasive ground Timken all steel multi-use bits are your best

bet. With correct and controlled reconditioning, they hold your cost per foot-of-hole to a minimum in ordinary ground when full increments of steel can be drilled.

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All Timken rock bits are made from our own fine alloy, electric furnace steel. And to protect their threads against drilling impacts, Timken bits have a specially

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ROADS AND STREETS

Sixty-Six Years of Editorial Leadership

Washington News Letter



Exclusive - By Duane L. Cronk, Director, Highway Information Services

April 10, 1958

A recession-minded Senate last month authorized an unprecedented \$7.7 billion for new highway construction in the next two years. This is nearly \$1.4 billion more than was authorized under the Highway Act of 1956 for fiscal 1958 and 1959. On the House side, Congressmen had only a few days earlier passed its regular biennial federal-aid program, granting record sums for construction on the ABC highway systems. As this is written, industry representatives are freely predicting that the two will be "married" in conference soon (perhaps by the time this is read) and that a combination measure will be on President Eisenhower's desk early in April.

When these last - and really mechanical - obstacles are hurdled, the road-building industry can breath a long sigh of relief. For over the last two years since the accelerated highway program was originally launched, there have been a series of threats to the "schedule," each leaving the industry more uncertain of the job ahead. The new act lists the pay-as-you-go Byrd Amendment which would have forced several highway departments to otherwise reduce their contract schedules. Now the Bureau of Public Roads can make the huge apportionments as they come due, without regard to the condition of the Highway Trust Fund, thus restoring the volume first envisioned for the National Highway Program.

* * *

Only one or two Senators seemed even remotely afraid that too much money was being proposed. As for the House, Congressman George Fallon's multi-billion dollar ABC bill bounced in and out of the chamber in about five minutes. The national legislators obviously wanted an anti-recession public works program in a hurry and the highway effort was embraced as one with the greatest public appeal. Roads Subcommittee Chairman Senator Albert Gore and Congressman George Fallon had told the American Road Builders Association several weeks ago that they were going to rally support for a sharp step-up in the highway program. The new measure reflects that effort.

* * *

It authorizes \$7.0 billion of federal aid for fiscal 1960 and 1961, plus about \$700 million more for fiscal 1959 (which begins July 1 this year) than was previously scheduled. This \$7.7 billion will produce, with state matching money, a federal-state program of nearly \$10 billion. Here's a breakdown of the Senate-passed measure:

* \$5 billion was approved for Interstate highways in 1960 and 1961 plus \$200 million more for 1959. These funds would be matched 90-10.

(continued on next page)

• \$1.8 billion was approved for the regular ABC (Federal-Aid Primary, Secondary and Urban) Systems for those two years - on a 50-50 matching formula.

• \$400 million more was authorized for new ABC roads in 1959. Recognizing the inability of the states to match this additional money 50-50, the Senators put this on a 70-30 basis. In addition, they authorized the Secretary of Commerce to lend up to \$115 million to the states for matching money. (This provision, in effect, would put the \$400 million anti-recession funds on a 90-10 formula, same as for Interstate construction, if agreed to by the House.)

• \$269 million more was authorized for public domain roads in 1959, 1960 and 1961. No matching money required.

Much of the new money will be made available to the states immediately - about \$700 million, in fact. And the whole 1960 apportionment of \$3.5 billion will be advanced six months to July 1 this year. This big "kitty" will be divided among the states within the next three months instead of at the end of the year as previously planned.

* * *

The \$400 million in anti-recession money must be awarded to contract before December and on jobs which can be completed by the next December. Also of significance to contractors: These funds may be applied only on ABC systems, not Interstate projects. There is far less right-of-way involved on such work to siphon off the available money and far less engineering to accomplish before such jobs can be awarded. Furthermore, a highway department can schedule this work around the state where needed to combat unemployment, rather than on perhaps a few concentrated miles of Interstate location.

So the effects will be almost immediate - in large actual contract awards in some states. Here are some of the reactions Roads and Streets heard in Washington last week:

• The Bureau of Public Roads predicted the new Act will produce at least \$600 million worth of additional lettings in 1958, above the volume previously expected.

• ARBA's Contractor Division Chief Burton Miller declared the new money will give the roadbuilding industry "a much-needed shot in the arm" and estimated that it would shove some jobs onto the market within 60 days that otherwise wouldn't appear this year.

• State highway officials were generally delighted with the measure, although some admittedly will be forced to raise more matching money. Executive Secretary of AASHO Alf. Johnson said the big federal-aid bill will give the states "a terrific psychological lift" and restore the momentum of the National Highway Program around the country.

* * *

The state highway departments will again be "on the spot" to deliver now that Congress has reaffirmed its desire to support the accelerated highway program. Some departments are so geared up already that without the federal aid they would have had to reduce their contract letting schedule this summer. The new grants will make it possible for these leaders to maintain their pace. Other states,

still short of engineers and matching money, will not be able to pick up their federal monies for some time.

A mass meeting of all the state highway departments will be held with Bureau of Public Roads officials in Washington within the next few days. The objective: To discuss the new law, section by section, and to explore ways of stepping up productivity.

* * *

Contractors will be pleased to hear that other provisions in the Act are of direct benefit to them. One of these makes possible quicker payment for materials delivered to the site. Heretofore, federal law has prohibited the Bureau of Public Roads from paying the states for such materials until actually incorporated into pavement or bridges. Consequently, many states followed the same practice. The new law, however, will not permit the BPR to reimburse the states for materials delivered to the job and the highway departments are expected to follow suit with earlier payments to their contractors. The result will be a significant easing of the burden on contractor's working capital.

The Senators were satisfied, apparently, that the tax dollars going into highway construction would be well spent. In debating whether to accept the BPR's estimate of cost of the National Interstate System, it was revealed that contractors are bidding well below engineers' estimates. Senator Albert Gore introduced a BPR survey which found that low bids on federal aid projects over the past few months have been running about 7 percent under the states' estimated cost of the jobs. Bureau officials told Roads and Streets that 625 contracts were analyzed to obtain these data. The engineers' estimates totalled \$821 million; low bids came to \$762 million for a saving of nearly \$60 million.

How Many Jobs in The Highway Act?

Congressmen, although generally agreed that a big roadbuilding program would stimulate the economy, asked - in both hearings and during floor debate - for specific statistics. Here are some which the Bureau of Public Roads and the American Road Builders Association presented in testimony:

- For every \$18,000 invested in highway construction, one job would be created on the project and another job in a supporting industry, such as steel production or equipment manufacturing.
- Every \$1 billion pumped into highway construction would create 5.7 million 40-hour work weeks.

Federal Highway Administrator Bertram Tallamy told the Senate Subcommittee on Roads that only 6% of the ABC System funds go into right-of-way, compared with 37% of Interstate System funds. The greater proportion of money for construction on the ABC systems led the Congressmen to stipulate that the \$400 million anti-recession fund be expended here.

However, Mr. Tallamy pointed out, the great number of structures to be built and utilities to be relocated along Interstate routes will require the services of hundreds of thousands of skilled and semi-skilled construction workers this coming season.

At least one Senator, however, feared that the flood of new money and more work would drive road building costs up. Senator Lausche of Ohio claimed he had received word from several contractors anticipating that labor and materials costs would rise 10% a year. The state highway department had told him there is now "sound, keen competition," he said. "But I will be a bitterly disappointed man if, at the end of one year, we find that, whereas we were trying to stabilize the economy and provide jobs, 10% of the amounts provided will have been expanded for increased costs of materials, supplies and labor."

* * *

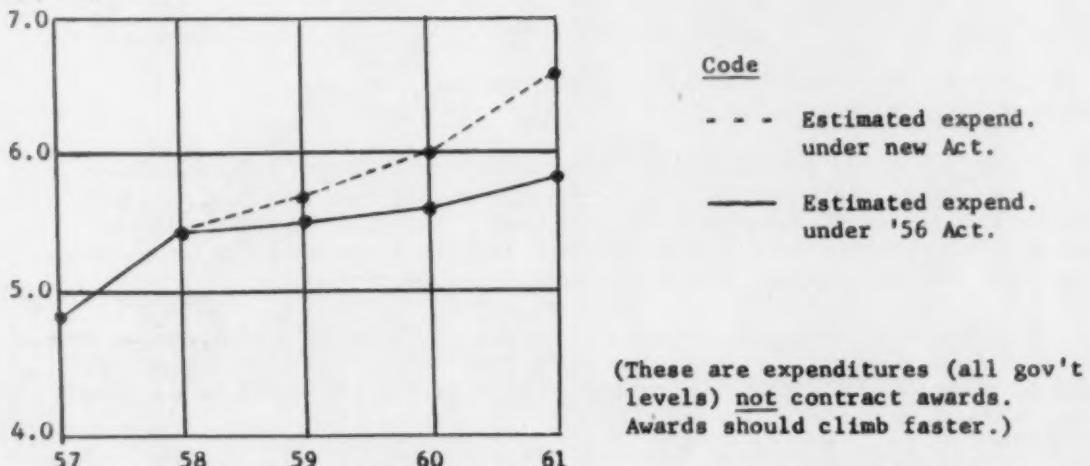
With passage of the "Federal-Aid Highway Act of 1958," the American road-building industry will be called upon to exert itself as never before. Close to \$10 billion in federal and state matching money is herewith poured into the long pipeline that leads to the contracting industry and the mammoth supporting industries - manufacturers of construction machines, cement and the host of steel products required for every mile of new highway.

Last month Roads and Streets offered forecasts of what the highway construction market would probably be if the proposed federal legislation were passed and if it were not. Congress has done its part to push roadbuilding onto a higher-than-ever level. There now appears to be every reason for the more optimistic view to prevail (see graph below), with perhaps one mental reservation. The state highway departments have testified they can carry the heavier load; some have yet to prove it. It must be pointed out, too that the Act just passed does not yet include funds sufficient to complete a \$40-billion Interstate System within 13 years. The campaign must go on.

These points aside, the new legislation does give the highway market a long-range outlook of growth anticipated by perhaps no other facet of the construction industry. In a period of economic uncertainty, Congress has reaffirmed its desire to give American engineers and contractors the money they need to produce a modern superhighway system.

The impact of the 1958 Highway Act is graphically portrayed in the illustration below. The latest estimate of highway construction put in place in 1958 will be up 14% over 1957. And actual contract awards will be up even more sharply.

(Billions)



B.F.Goodrich



B.F.Goodrich tires give up to 50% more service, contractor reports

F. R. HEWETT CO., general contractor of Spokane, Washington, operates 147 pieces of equipment on jobs throughout the Pacific Northwest. Here the job is the Spokane Valley Freeway. "We switched to B.F. Goodrich FLEX-RITE NYLON Rock Logger tires 3 years ago," writes Truck Supt. Richard M. Ward. "They have given us up to 50% more service than the tires we used previously—and we have been able to retread them too!" Today Hewett uses B.F. Goodrich tires 100%.

Reports like this come in from contractors all over the country. They find B.F. Goodrich off-the-road tires give

them longer, trouble-free service, thanks in part to FLEX-RITE NYLON cord construction. FLEX-RITE NYLON withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. Result: the FLEX-RITE NYLON cord body outwears even extra-thick B.F. Goodrich treads —can be retreaded over and over.

Follow the lead of contractors like Hewett, who reports B.F. Goodrich tires give "very low cost per hour." See your B.F. Goodrich dealer today. He's listed under Tires in the Yellow Pages of your phone book. And ask about the new Rock Service Tubeless or conventional

tire that prevents unnecessary tire failures! *B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.* Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment

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ROADS AND STREETS, April, 1958

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ESCO CUTTING EDGES AVERAGE 200



RICHARD CHAFIN, project engineer of Madonna Construction Company, uses ESCO cutting edges to keep maintenance costs low.



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Cutting edge longevity is only half the story. Bits that last longer mean less down time, lower charges against machinery idled through frequent bit changes. *ESCO* cutting edges, Chafin found, maintained the 150 cubic yard-per-hour rate that he considers essential if earth moving is to pay.

What *ESCO* products did for this project engineer, they can do for you. Put *ESCO*'s durability to work for you. Use *ESCO* cutting edges — they'll save you time, when time is money.

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Rock Grip Wide Base

Rock Grip

ROADS AND STREETS, April, 1958



Water-oil-cooled Gardner-Denver rotary portables are available in five capacities: 125, 210, 365, 600 and 900 cfm.

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Quality equipment costs less to use. Gardner-Denver rotary portables and air tools cost less three ways. They do a better job faster . . . stick to a job with a minimum of maintenance and down time . . . stay in service longer.

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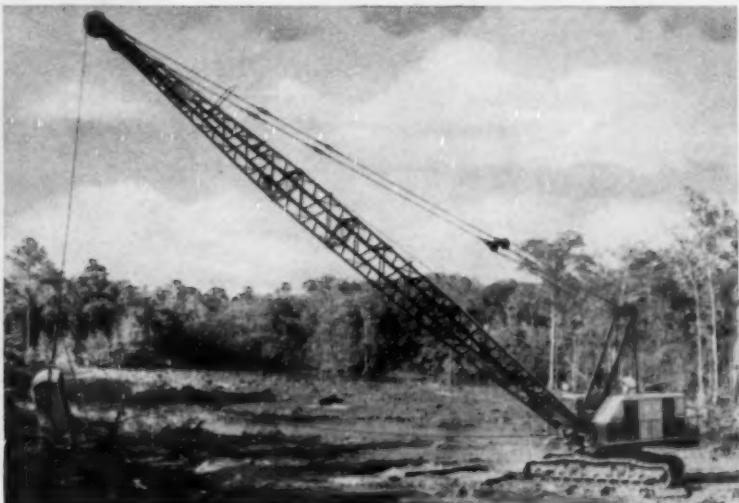
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From Colorado to the Carolinas . . .

Owners get more time for OUTPUT with Bucyrus-Erie . . . You Can, Too



On a highway resurfacing job near Silver Plume, Colorado, a 1½-cu. yd. Bucyrus-Erie 38-B dragline feeds a portable crusher plant. Owner: Northwestern Engineering Co., Denver.



In South Carolina, Atlantic Dredging Company of Manning has no trouble keeping work on schedule with this Bucyrus-Erie 71-B dragline. The job: relocating Waccamay River near Conway to permit construction of a state highway.

For years Bucyrus-Erie draglines have provided top performance on highway, road, and street construction jobs throughout the country. With a Bucyrus-Erie dragline, you get more working time each hour of every shift — more daily output — because:

It's built tough. Parts are simple, large, few in number — there is little that can go wrong. It stays on the job. Machinery is arranged simply, compactly so that maintenance can be handled quickly with little downtime. It's easy to keep a Bucyrus-Erie going at top capacity. Exceptional synchronization of speeds and power assures smooth, well balanced work cycles . . . fast, responsive control.

Why not join the growing list of owners who have profited from Bucyrus-Erie draglines. Your nearby Bucyrus-Erie distributor will gladly help you select the right size of machine — ranging from $\frac{3}{8}$ to 4 cubic yards — for your requirements.

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DESIGNED FOR YOU! You can count on bonus output ability from your dragline when the boom carries Bucyrus-Erie New-Design bucket. It's engineered for fast, full loading, clean dumping. Bucyrus-Erie Buckets are made of BEC-OLOY — a steel alloy developed by Bucyrus-Erie especially for dragline buckets. This 1½-cu. yd. bucket is caught in action on a road job in Toledo, Ohio — on a 30-B owned by Schoen Asphalt Paving Co.

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A Familiar Sign . . .

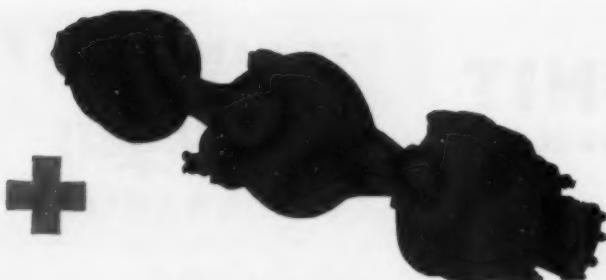
**BUCYRUS
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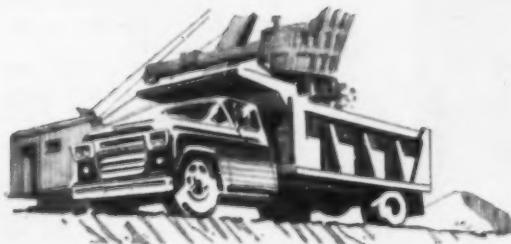
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THE NEW UNIT *Challenger* ... as a DRAGLINE



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Tough Blading in Heavy Clay

(The Cover Scene)

Pictured on the cover this month is an operation which typifies the No. 1 problem of the grading contractors on the 187-mile Illinois Toll Road. Over 50,000,000 cubic yards of earthmoving was accomplished during the 1957 working season. It was a phenomenally wet summer, and the widespread prevalence of heavy clay made the going difficult on many of the jobs.

The answer was heavy equipment. This scene shows for example a Galion "Grade-O-Matic" Model T-700 motor grader laying out and manipulating chunky clay on contract section T-9, northwest of Chicago. This \$9.7 million job covering 9.4 miles of toll road, structures and appurtenances, had some of the worst clay seen on the entire toll road.

Contractors in joint venture are Contracting and Materials Company, of Evanston, Kenny Construction Company, of Skokie, Ill.; and Louis Garavaglia, of Centerline, Mich.

The grader pictured, with its 40,125 lb. weight and its 190 hp diesel engine with torque converter and power-shift transmission, was considered an effective machine for the conditions. Repeated turnover was often required for each lift, to help break up and aerate the heavy soil. Using an extensive fleet, the excavation totaling 3,000,000 cubic yards was largely cleaned up by winter despite the weather delay.

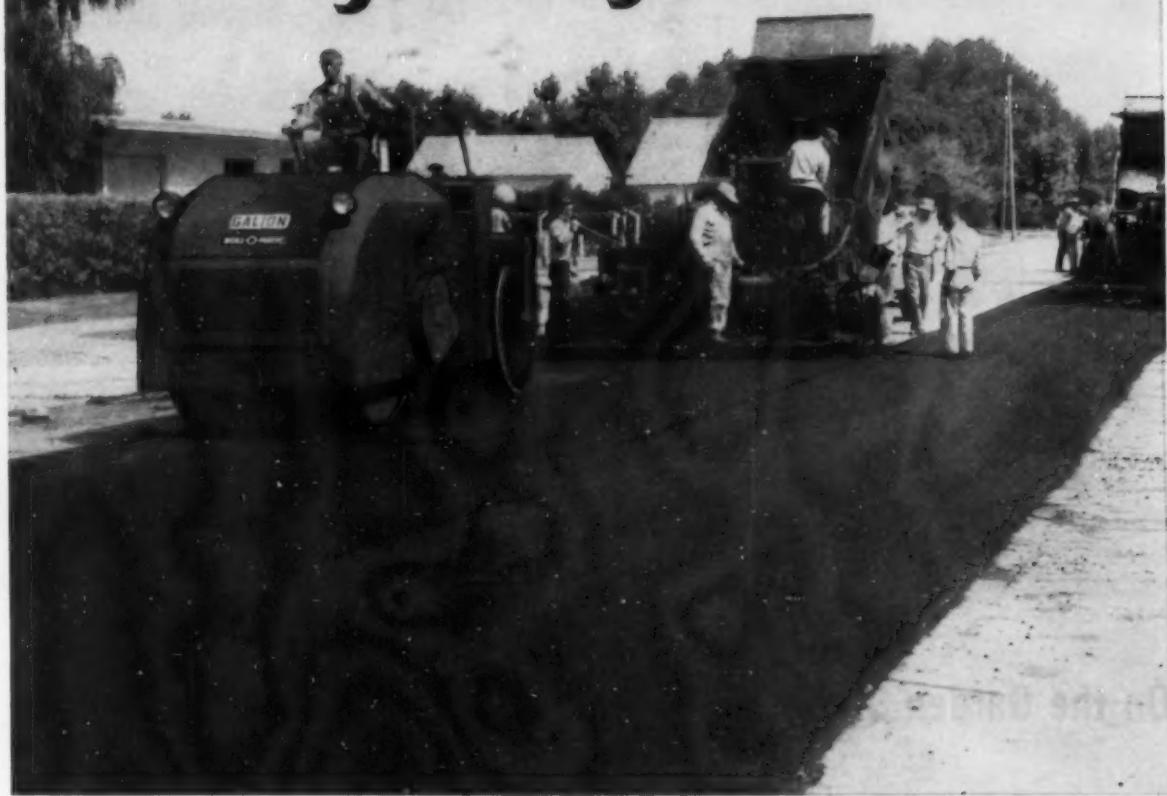
Bench Mark Project Sponsored

The St. Louis (Mo.) County division of highways has sponsored a project to list and catalogue all available bench marks in the county which have been referred to sea level datum.

Lists of these bench marks, together with all pertinent information relative thereto, are being collected from consulting engineers, municipalities, the metropolitan St. Louis sewer district, state highway department, and other sources. The city has kept such a list for many years.

A field check will be made to determine whether all such bench marks are at the locations indicated.

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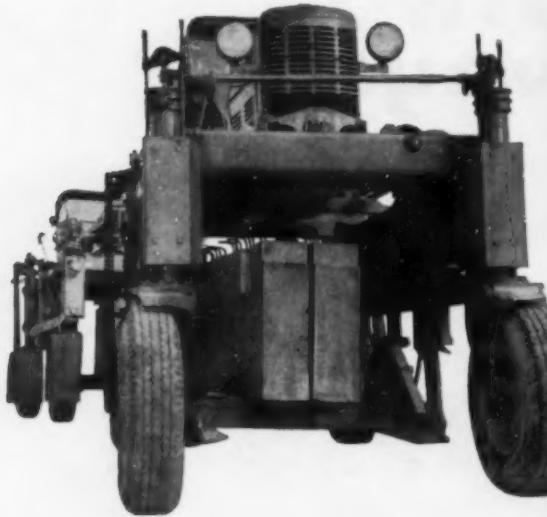
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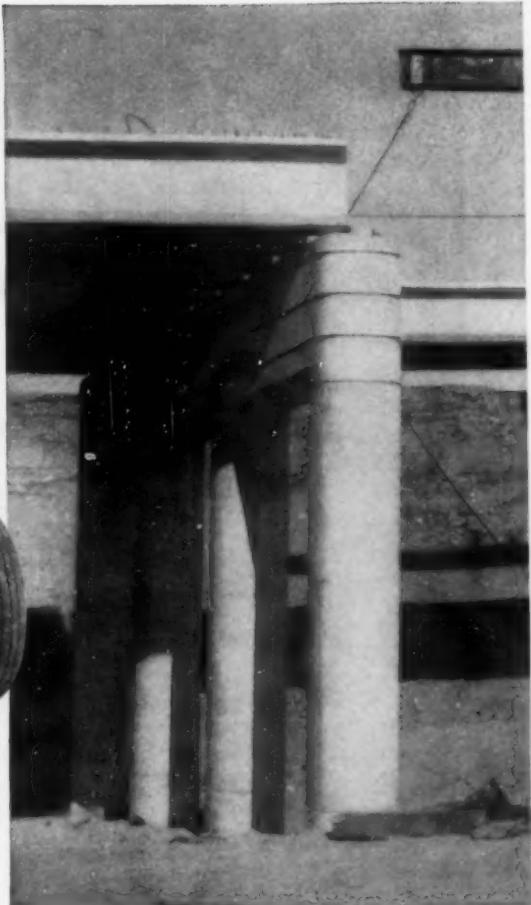


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PLACING MAIN SPAN GIRDERS—A crane with a spreader beam is erecting a main span girder prestressed with USS American Super-Tens Stress-Relieved Strand. Note the ease of erection.



NEW WAY TO MOVE GIRDERS—Here a straddle truck is transporting a girder from the prestressing plant to the job. This was a time- and money-saving way to transport prestressed girders. Construction was speeded up because the girders were precast, then transported to the job site for immediate erection.



On the Garden State Parkway . . . 405 prestressed

HERE IS the new USS American Super-Tens Stress-Relieved Strand reel furnished in standard sizes of 50" and 44". The new 2-ply construction resists warping and splitting, resulting in longer service life.

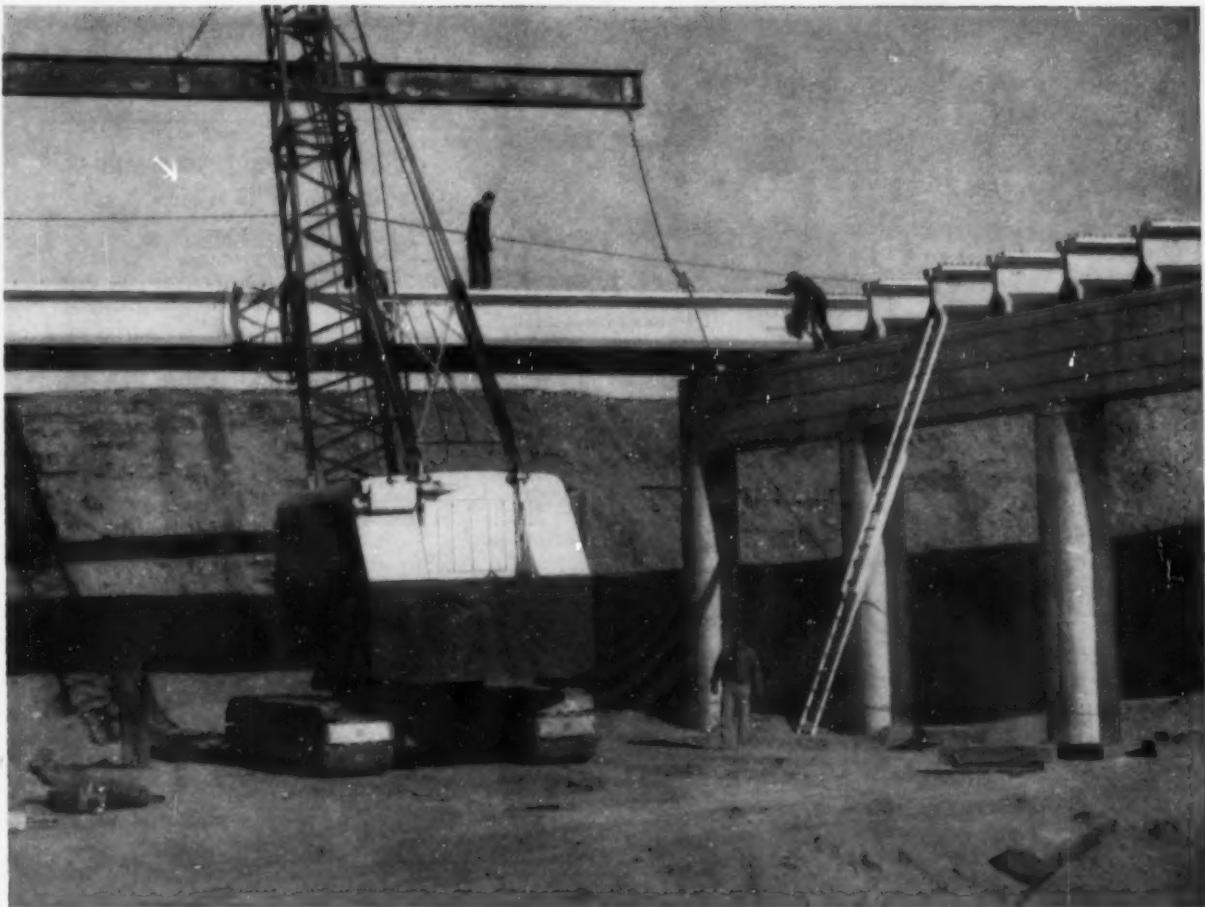


Linking New Jersey with New York and New England, the recently completed section of the Garden State Parkway is 9 1/4 miles of ultramodern highway. Along this new super-road there are eighteen prestressed concrete bridges. USS American Super-Tens Stress-Relieved Strand was used on this modern superhighway development.

The manufacturer of the prestressed beams

USS American

These people built this section of the Garden State Parkway:
Design Engineers: Fay, Spofford & Thordike, Inc., Boston, Mass. • Contractor & Manufacturer of Prestressed Beams: Reid Contracting Company, Inc., Woodbridge, New Jersey; L. W. Lancaster, Chief Engineer • Consulting Engineer for Contractor: Charles C. Zollman & Associates, Newtown Square, Pennsylvania.



beams were produced in 81 days

for these bridges produced more than 400 prestressed beams in eighty-one days.

Prestressed concrete is a proven construction material with unlimited possibilities in building roofs, floors, walls, beams, slabs, columns, and foundations, as well as for bridges. American Steel & Wire pioneered in this development in 1951 by being the *first* to develop a new product—special high tensile

strength strand for the first pretensioned bridge in this country. Our engineers have much experience in this field, and they will be happy to discuss the application of prestressed concrete to your construction needs.

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Voided bridge piles save money!



Tampa Bay Bridge, Florida
Hardaway Contracting Company, contractors
State of Florida Bridge Dept., engineers and designers.



Precast, prestressed concrete piles contain
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The Tampa Bay Bridge connects Tampa and St. Petersburg, Florida and is a 3-mile long structure accommodating four lanes of traffic.

Piles for the project are 24" square, precast, prestressed concrete containing 12" O.D. Sonoco SONOVOID Fibre Tubes and twenty-four 7/16" seven-strand pretensioning cables.

There are 285,000 linear feet of piles varying in length from 60 to 110 feet. The average pile length is 75 ft. and despite these rather long piles, it is reported that the cost of the structure is very low.

Sonoco SONOVOID Fibre Tubes were specifically developed for use in bridge decks, floor, roof and lift slabs and in concrete piles. For prestressed precast units or units cast in place.

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Headlines

Ohio Awarded \$290.5 Million In Contracts in 1957

Omitted from the tabulation of highway contract awards, as published in the February *Roads and Streets* (page 64) were the figures for Ohio. According to Charles M. Noble, Secretary to the Governor, the 1957 contract letting program by the Ohio Department of Highways totalled \$290.5 million.

This figure, which represents one of the largest, if not the largest volume of road work awarded by one state in one year, includes right-of-way and engineering. The figure compares with \$223.0 million awards for the 1956 calendar year.

New York State Road Contracts at Record High

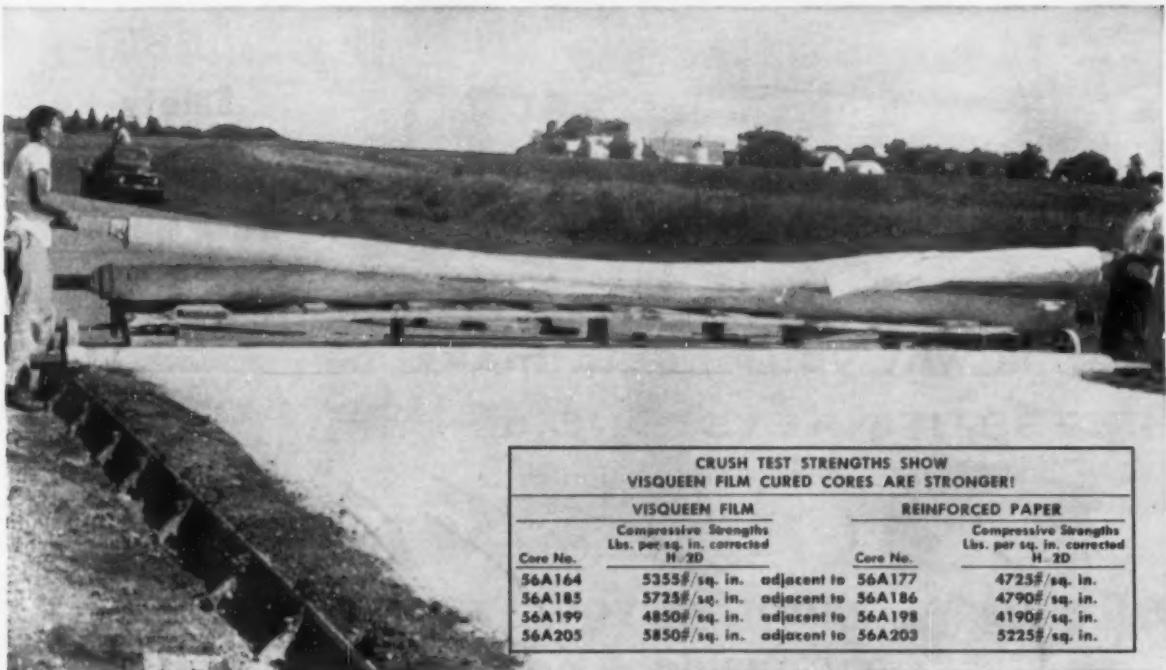
The volume of highway construction work under way in the program of the New York State Department of Public Works stood at \$414 million as of January 1, 1958. This all-time high record volume of work totals 760 miles, and includes Thruway projects.

The dollar work load was nearly doubled in the year 1957. The department expects to maintain the present high work load by issuing bonds under the \$500 million issue authorized in 1956.

Ohio Needs Still More Federal Roadbuilding Funds

Even the huge outlays of federal funds under the 1956 highway Act, with 90 percent federal participation for interstate projects, is not enough to keep the juggernaut rolling in Ohio, it seems. A recent news dispatch out of the office of state highway chief Charles M. Noble states that "Ohio's big road program may have to be cut back next year because of a lack of federal funds".

With a large backlog of plans, the highway department has been able to set up projects for all of the 90 percent money received to date, totalling about \$200 million. "Soon we will be operating entirely on state money" Noble explained, "using our state funds for the federal government's share until we can be reimbursed."



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Core strength tests show results obtained with VISQUEEN film curing blankets.

"VISQUEEN" FILM GIVES STRONGER CURSES WITH GREATER ECONOMY

LOW FIRST COST—plus as many as 23 re-uses cut blanket costs to a fraction of a cent/sq. ft.

LOWER LABOR COSTS result because white opaque VISQUEEN film is far lighter, hence easier, more speedily handled. 1000 sq. ft. of .004" thickness weighs 20 lbs. And white opaque VISQUEEN film curing blankets stay light. Will not absorb moisture.

TIME SAVING: When using VISQUEEN film curing blankets, additional watering is not necessary. The film rolls up easily—needs no drying or special handling. Will not rot or mildew. Inert—no chemical reactions with concrete—leaves no deposit on slab.

ONLY VISQUEEN film comes in standard widths—or blankets—seamless widths up to 32'. Available in 14' roll widths with no folds.

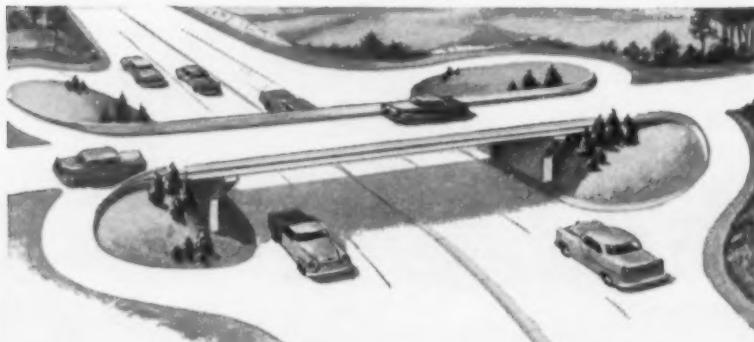
ADDITIONAL USES of VISQUEEN film: rain blankets, equipment and material covers.

Write now—or use the information request tag below for full information on how VISQUEEN film can do your job better at less cost.



VISQUEEN film—the first and foremost polyethylene film. A product of the long experience and outstanding research of **VISKING COMPANY** Division of **UNION CARBIDE** Corporation
P. O. Box 1410, Terre Haute, Indiana
In Canada: **VISKING COMPANY, DIVISION OF UNION CARBIDE CANADA LIMITED**, Lindsay, Ontario.
VISKING and VISQUEEN are registered trademarks of Union Carbide Corporation.

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paving & building
product needs

- EXPANSION JOINTS: PRE-MOULDED ASPHALT AND NON-EXTRUDING FIBRE OR KAPCORK®.
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- KAPCO® HOT POUR ASPHALT-RUBBER JOINT SEALING COMPOUND.
- KAPCO® HOT POUR JET AIRFIELD JOINT SEALER.
- KAPSEAL® CRACK FILLER.
- CONCRETE CURING COMPOUND.
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No need to shop around when you can get all your wants in this giant supermarket of paving products. If you use it... we have it.

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Why carry a big inventory on low-need items? Stock only what you'll need—carry a more diversified stock—when you order under Presstite Keystone's freight-saving "Mixed Carload Plan." Ask us about it.

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Less paper work, easier and faster handling, more net profits for you.

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Two reliable names combine to bring you controlled quality, reliable delivery—and a personalized engineering service whenever you need it.



Division of AMERICAN-MARIETTA COMPANY
3782 CHOUTEAU AVENUE, ST. LOUIS 10, MISSOURI

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Job Safety

Sparking Hazards of Metal Tools Studied By Navy

"Non-sparking" hand tools are no more effective than those of steel in preventing accidental ignition of explosive or combustible atmospheres, according to a conclusion of a Navy report just released for industry use through the Office of Technical Services, U. S. Department of Commerce.

The conclusion was reached during a survey of sparking characteristics and safety hazards of metallic materials. It was found that sparks or impacts and subsequent ignitions can result from use of low sparking materials such as copper. It was also shown that metallic sparks can be produced by contact between a non-sparking and a sparking metal.

Another significant result was the observation that nonmetallic sparks can be produced by low velocity impact of metal on quartzitic rock. Impact was indicated as a more hazardous source of ignition than friction sparks, particularly in firedamp, or methane-air, encountered in mining operations.

The volume, PB 131131 *Sparking Characteristics and Safety Hazards of Metallic Materials*, H. Bernstein, U. S. Naval Gun Factory, Apr. 1957, may be ordered from OTS, U. S. Department of Commerce, Washington 25. It contains 36 pages, price \$1.

Five-Minute Safety Talks

The second of a series of "Five Minute Safety Talks for Construction and Maintenance Foremen," has been published by the National Safety Council, Construction Section. (The first book which sold 23,000 copies is credited with being an outstanding success).

The second set of talks is intended to help in training workers, and to aid supervisors in carrying out their work more effectively. The wide range of subject matter provides an entire year's supply of safety training material.

Each of the two books is available at \$1.95 down to \$1.60 each, depending upon the quantity ordered. For details write to National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill.

4-machine utility in the large economy size

3-YD TD-18 4-in-1!



For your big contracts that are "jumping with jobs"

IT'S A... Skid-Shovel

...with exclusive pry-over-shoe break-out and ground-level roll-back.



IT'S A... Clamshell

...that fills itself in one fast gulp—gives you hopper-high, self-clean-out dumping.



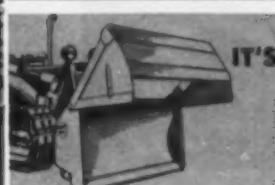
IT'S A... "Carry-type scraper"

...that grades, strips, or spreads with inch-close accuracy. "Boils" itself full!



IT'S A... Bulldozer

...with clam lip up and shoes on the ground, it's a big-yardage, earth-rolling blade!



Contractors are replacing the performance of a power shovel, bulldozer, clamshell, scraper, and "single-action" tractor loader—with one International Drott 4-In-1. The 4-In-1 strips and grades with accuracy, too!

The big 3-cu yd rig (shown) is the mass producer of the 4-In-1 line. It's sized to do an endless variety of big jobs on big contracts. It gives you king-sized 4-machine utility, for one moderate price!

From the bonus-powered TD-18's foam-cushioned seat, you just move the "machine selector" lever to position any of the four big-capacity 4-In-1 actions for instant use!

Add up the thousands of dollars a TD-18 4-In-1 can save you, in price and wages. Measure the huge, tough-job advantages of exclusive pry-over-shoe break-out action. See what it means to command the built-in performance protection of exclusive, shock-swallowing Hydro-Spring. See your International Drott distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL
DROTT

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MODEL C-362

36 H.P.

Other Models
Gasoline or Electric
Priced from \$395

The All NEW *Clipper* "SAILS RIGHT THRU"

**36 H.P. SELF-PROPELLED
CONCRETE SAW**

features

- DUAL BALANCE DESIGN
- POWERFUL HEAVY-DUTY TRANSMISSION
- POSITIVE BALL BEARING SCREW FEED
- 6 STEEL-CABLE-REINFORCED V-BELTS

**USE THIS HIGH PRODUCTION CONCRETE SAW FOR
FASTER CUTTING WITH LONGER BLADE LIFE**

OVER 36 OUTSTANDING FEATURES FOUND ON NO OTHER SAW!

DUAL BALANCE DESIGN—Precision weight distribution for ① Easy Maneuverability . . . one man lifts-up, lines-up, then saws, ② Constant adequate weight over the blade during cutting. Only Clipper has it!

POWERFUL HEAVY DUTY TRANSMISSION—Exclusive Abrasive Coated Drive Wheels transmit power to rear wheels for continuous forward thrust.

POSITIVE BALL BEARING SCREW FEED—Assures accurate cutting depth control. A MUST for abrasive blades.

6 STEEL-CABLE-REINFORCED V-BELTS—Delivers full 100% power to the blade for best economy and performance.

RUGGEDLY BUILT TO GIVE YEARS OF TROUBLE FREE SAWING!

FREE DEMONSTRATION

THERE'S A CLIPPER BLADE FOR ALL SAWs —
ANY AGGREGATE — EVERY JOB!

Call Your Clipper Factory Trained Representative
Collect for Immediate Shipment or Demonstration

THE CLIPPER MANUFACTURING COMPANY

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632A Offices in Principal Cities Coast to Coast; Factories in England, France, Germany, Italy

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Look ahead...move ahead...and stay ahead

with ALLIS-CHALMERS



the fastest-growing name in motor scrapers



In 1957, earth movers the world over bought more Allis-Chalmers motor scrapers than ever before! This growing popularity is the best proof of the productivity and reliability of this outstanding line. There are good reasons for this trend toward Allis-Chalmers construction machinery . . . investigate these advantages before you buy.

Three models to
help you match
your job needs . . .

TS-360

Fastest-loading big
machine in the
business . . . 280 hp
moves 20 yd loads
at high speed.



the only line with all these basic



Profit-boosting performance and dependability

TS-260

A new measure of performance in this size range... 200 hp... 14 yd... full 90-degree turning.

TS-160

True versatility and economy in a utility machine... 155 hp... 9½ yd... turns non-stop in less than 25 ft.



advantages in every size...

- high power-to-yardage ratio
- low, wide bowl
- positive forced ejection
- high apron lift

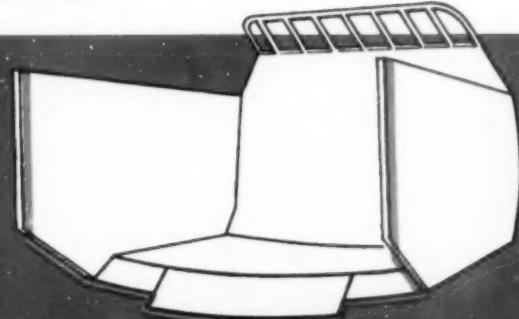


on the big jobs... or for utility work

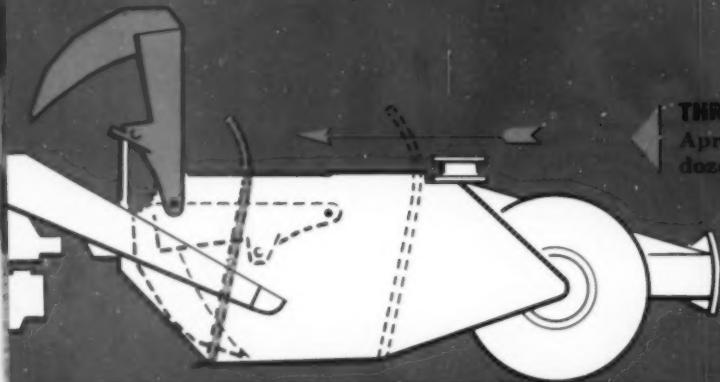
See these big advantages of Allis-Chalmers motor scrapers

...IN A WORKING DEMONSTRATION

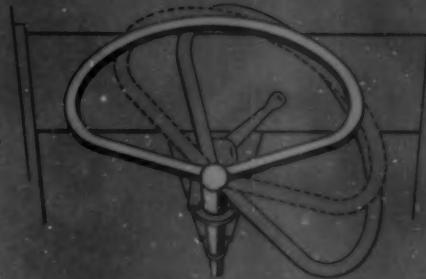
LOW, WIDE BOWL... Loads full
—fast—with low resistance,
live action.



THREE-POINT APRON-EJECTOR LINKAGE—
Apron opens high as the positive ejector
does out the load... clean and quick.



SELECTIVE HYDRAULIC STEERING—Accurate, sure
control at any speed... fast, full-swing steering
with a 30-degree turn of steering wheel right or left.



A DEMONSTRATION WILL PROVE IT—

Your Allis-Chalmers dealer will be glad to arrange a demonstration to show you these machines in action. When you've seen and tried these high-performance motor scrapers, you'll know why more dirt movers every day...

Look ahead...move ahead...and stay ahead

ALLIS-CHALMERS CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



ILLUSTRATED GMC FW556 MONEY-MAKER is just one of a complete line of GMC's extra-stamina-engineered for construction work. They're available with conventional, dual-purpose or c.o.e. cabs — gasoline or Diesel power — regular or Allison Torqmatic* transmissions.

*Optional at extra cost



Now-haul 7 yards of mix every trip

in nearly all of the 48 States!

GMC's spanking-new FW556 is your truck! For no other regular, in-production model anywhere can haul 7 full yards at a clip — even in states with limitations as low as 46,400-lbs. gross.

You see, this rig's all "muscle": with $\frac{3}{8}$ -inch heat-treated frame rails that eliminate the need for reinforcement—rubber "biscuit" mounting instead of steel springs—aluminum saddles and wheels.

The pay-off is a vehicle weight of only 11,087 pounds. Add 6,760 pounds for a lightweight

mixer, and you still have room for 28,350 pounds of payload — all within a 46,200-lb. total.

Power to haul these extra-size loads comes from GMC's 370-cubic-inch V8. It delivers 232 high-torque horsepower that takes on the toughest on-and-off-the-road work without breathing hard. And it turns the 7-yard barrel, too — through its front-end PTO.

But the real eye-opener is its price tag! For all these advantages are yours at a figure *hundreds of dollars* lower than anything else close to its class. Check that at your GMC dealer's!

GMC TRUCK & COACH—A General Motors Division

GMC—America's Ablest Trucks

Available in Models from $\frac{1}{2}$ to 45 tons

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Solve Clay Plasticity Problems WITH LIME STABILIZATION



Mixing lime and clayey base course material in secondary road job in Louisiana

LIME SHARPLY REDUCES PLASTICITY INDEX (P.I.) OF UNSTABLE CLAYS, SILTS, AND CLAY-GRAVELS

*In Subgrades
In Base Courses*



Sticky, fine-grained soils, that have always plagued highway engineers, can be greatly improved with lime as determined by simple, standard P.I. tests.

Lime agglomerates fine clay particles into coarser, more friable fractions and increases plastic limit above critical moisture content—and in so doing, eliminates damaging swelling and shrinkage, the main cause of base and subbase failures.

P.I. of raw soils have been reduced from 15-50 to 6-15 with only 3% of hydrated lime (by weight) on basis of many actual projects.

OTHER BENEFITS—Lime invariably increases the strength (bearing value) of the subbase or base course as determined by CBR and stability tests.

Low Cost — **Expedites Construction** — **Reduces Maintenance** — **Enables Utilization of Substandard Base Materials.**

Lime stabilization — 13 years successful durability experience—over 2500 miles constructed.



Write for further information and FREE booklet:
"LIME STABILIZATION OF ROADS"

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ADDRESS _____

CITY _____ ZONE _____ STATE _____

NATIONAL LIME ASSOCIATION

925 15TH STREET, N.W., WASHINGTON 5, D.C.

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44

Personals

Portland Cement Association Appoints New Bureau Manager

The appointment of Gordon K. Ray as Manager of the Highways and Municipal Bureau of the Portland Cement Association is announced by George H. Paris, Director of Promotion Planning and Engineering Services. He succeeds Leo M. Arms, who has been named Technical Adviser to the bureau. The two appointments were made to assure continuity of operations prior to Mr. Arms' retirement on December 1, 1958.



Gordon K. Ray

Mr. Ray joined the Association in 1945 as an engineer in the bureau, and since 1952 has held the position of Consulting Highway Engineer. During this period he has specialized in pavement design and construction.



Leo M. Arms

Mr. Arms has managed the Highways and Municipal Bureau since
(Continued on page 46)

what's it worth to always face your work



DAVIS

LOADER-BACKHOE

lets you see what you're doing



A Davis Loader-Backhoe combination will put money in your pocket by outperforming any other rig—pound for pound, dollar for dollar.



EXCLUSIVE FLUSH DIGGING—Entire mast and boom assembly shifts from center to either side for flush digging alongside buildings, fences, hedges, and other obstructions. Only Davis has this advanced feature.

You will be amazed how many man hours a Davis Loader-Backhoe will knock off your production schedule.

Notice how the seat of the Davis Backhoe revolves with the boom and bucket. **You always face your work!** You can be more accurate and you're not as tired at the end of a long day.

Big Machine Performance—Only Davis offers this along with other "big machine" features, such as individually controlled vertical stabilizers, 10,000 pounds breakaway, streamlined hydraulic system with finger-tip valve controls, and continuous operating arc.

Exclusive Versatility—Interchangeable Digging Position of the Model 210 lets you shift the Backhoe from the center to either side of the frame. Gives you versatility for digging flush alongside a building...extra reach to the side or for trenching along an embankment or slope.

No wonder the Davis Loader-Backhoe has become America's largest selling rig—it's priced lower than most competitive models, too!

Davis Loaders and Backhoes are available for all popular models of International, Ford, Fordson Major, Ferguson, Case, Massey-Harris, Allis-Chalmers, Oliver, John Deere, Minneapolis-Moline, and Work Bull Tractors.

SOLD AND SERVICED EVERYWHERE BY BETTER DEALERS

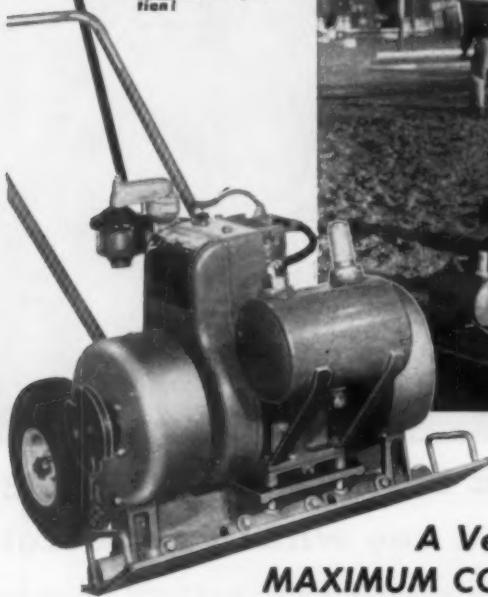
For the name of your nearest dealers call Western Union by number and ask for Operator 25... or write direct. Please specify make of tractor.



MASSEY-FERGUSON INDUSTRIAL DIVISION
MASSEY-HARRIS-FERGUSON, INC.
1009 S. WEST STREET • WICHITA 13N, KANSAS

THE NEW BARCO VIBRA-TAMP*

* Companion Tool
to the Barco Rammer, Famous for
Deep, Penetrating Soil Compaction!



**A Versatile Tool for
MAXIMUM COMPACTION of**

1. Granular Base Materials 2. Bituminous Surfacing

EFFICIENT—one man does the work of many with VIBRA-TAMP. Operates in any weather. Works flush against curbs, foundations, and walls.

ECONOMICAL—to buy, operate, and maintain! No special tools required. Saves your bigger, costlier equipment. Tamp up to 750 sq. yds. per hour.

SAFE—moving parts fully enclosed. Special vibration dampers reduce operator fatigue. Simple controls. Handle adjustable to comfortable height.

DURABLE—simple design and quality construction keep VIBRA-TAMP on the job day in and day out. Carburetor unaffected by vibration.

VERSATILE—use VIBRA-TAMP for all kinds of work—wherever low cost is a prime consideration. Take VIBRA-TAMP on the big jobs for hard-to-reach areas. Use it for patching streets, driveways, and roads. VIBRA-TAMP has no economy equal—a real work-horse on sand, gravel, soil, chippings! Ask for new catalog No. 630.

Worldwide Sales and Service

BARCO *Serving Industry Since 1908*
MANUFACTURING COMPANY, 515-E Hough St., Barrington, Ill.
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Personals

(Continued from page 44)

1952 and has held various technical and managerial positions in the bureau since 1932. A graduate in civil engineering from the University of Missouri and a registered professional engineer in Illinois, he is a recognized authority in the field of highway engineering.

General Anderson Retires

General James A. Anderson, State Highway Commissioner of Virginia for the past 16 years, retired officially and was honored with a ceremony by his employees and friends.

General Anderson is a past president of the American Association of State Highway Officials, and has held many other honors.

Asphalt Institute Appoints

Carl F. Lind has been appointed district engineer of the Asphalt Institute at Los Angeles, replacing Don G. Evans, who has resigned. Lind has been Flood Control Engineer for San Joaquin County at Stockton.

Richard S. Titera has been appointed Assistant Engineer for the Institute at Los Angeles.

BOYD S. OBERLINK, vice-president, Tractor Group, Allis-Chalmers Mfg. Company, has been elected president of the Construction Industry Manufacturers Association for 1958.



Boyd S. Oberlink



not even king size boulders stopped this Manitowoc!

Huge boulders . . . too big to pass through the dipper . . . didn't stop this Manitowoc 2½-yd. Model 3500 shovel from loading out an average of 1200 to 1300 yds. of abrasive granite every 7½ hour shift. Goodfellow Brothers of Wenatchee, Washington used two of the Model 3500 rigs for handling rock on a Washington State Highway project. This was a rush job . . . moving over 160,000 yards of rock alone in four month's time.

This rock was hard to blast which resulted in the huge, hard-to-handle boulders. However, the Model 3500 shovels have the power, speed and capacity to keep haul units moving in a steady stream from the job area. Simple, balanced design throughout delivers more horsepower to the dipper . . . there's no wasted power. The entire machine has only 14 gears and pinions and only working gears turn . . . a power-saving feature found exclusively on Manitowoc shovels and cranes. A massive, one-piece carbody mounted on long, wide-spread crawlers provides greater stability. Many other features give you advantages to bid lower . . . make more money on any job.

Your Manitowoc distributor will show you why Manitowoc beats them all for more profitable, powerful performance . . . call him now!

MANITOWOC ENGINEERING CORP.

MANITOWOC, WISCONSIN

CRANES SHOVELS DRAGLINES TRENCH HOES

20 TON - 100 TON 1-YD. - 5½-YD. 1-YD. - 6-YD. 1-YD. - 2½-YD.

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Laying concrete with Clark Wedge-Lok forms on Route #25, bypass, Findlay, Ohio.

LET
WEDGE-LOK
WORK FOR
YOU



Clark forms are specially designed for modern high speed construction. The exclusive Wedge-Lok and self aligning stake pocket feature reduces form setting time to a minimum. Joint deflection is eliminated. Ask your Dealer to show the complete Wedge-Lok line of curb and gutter forms and sidewalk forms.

For additional information and brochures contact your nearest Wedge-Lok Dealer or write, wire or call.

CLARK
INDUSTRIES

Construction
Equipment Division

375 East Fifth Avenue • Columbus, Ohio

A Unit of the Clark Grave Vault Company

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SAND BLAST the easy RUEMELIN way!

A practical Sand Blast Generator for all types of outdoor cleaning work. Removes rust scale, paint. Cleans bridges, removes laitance from cement. Cleans ready-mix trucks and highway equipment prior to re-painting. Equipped with remote control with deadman valve for stop and start at the nozzle! Wet type nozzles also available if desired. Portable units can be equipped with hi-speed mountings for highway trailing. Write for descriptive bulletin.

RUEMELIN MFG. CO.

MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3990 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

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AB-9405-16

New Publications

Soil Density Control

A bulletin on this subject, number 159, has been published by the Highway Research Board, 2101 Constitution, Washington, D. C. Price \$2.80.

This 135-page report contains four technical papers and discussions sponsored by the Board's department of soils, geology and foundations by F. N. Hveem, W. N. Carey Jr., W. H. Campen, J. F. Redus, J. R. Sallberg, H. W. Humphries, S. E. Roy, and Hans F. Winterkorn.

In issuing this report the editors note, "Since the early 1930's when the relationship between soil moisture, density and compactive effort was discovered, an increasing interest has developed in the use of density as a measure of compaction.

"Recently, efforts have been made by both engineers and contractors toward the preparation of specifications which call for compaction in terms of the quality of results rather than in terms of construction equipment and methods.

"If compaction is to be measured and specified in terms of density, significance of density needs to be well understood, and specification requirements so stated that they will result in the quality of construction intended. Moreover, adequate and realistic density values must be specified; and fast, accurate and practicable methods for measuring in-place densities must be provided.

"The four papers in this bulletin are significant contributions toward betterment of our knowledge of compaction, of methods of controlling compaction, and methods for measurement of soil density."

BRIDGES AND THEIR BUILDERS, by David B. Steinman and Sara Ruth Watson; Dover Publications, Inc., 920 Broadway, New York 10, New York. 400 pages. Price \$1.95. This paper-backed volume is written in a highly personal style, outlining the history of bridge building, and discussing the Mackinac Straits Bridge recently built by Dr. Steinman, and the "Galloping Gertie" Bridge at Tacoma which failed spectacularly, both of which are of interest to the layman as well as to the designing and constructing engineer.

(Continued on page 50)

The Tractors That Contractors Drafted

The NEW JOHN DEERE "440'S"



Ruggedness, power, operator's comfort, and all-around economy are featured in the new "440" Crawler.

THE new John Deere Crawler and Wheel Tractors are just what contractors ordered—big-capacity power at low cost—low in initial cost and in operating cost.

Both John Deere Tractors are ruggedly built from grille to drawbar . . . designed, inside and out, to fill definite needs in construction work of all types . . . to cut costs to rock-bottom on every job you assign them. Both tractors are built around the amazingly efficient John Deere engine, unmatched for delivering so much for so long for so little. Both are ruggedly constructed and boast many features, including optional clutch-type direction reverser, that enable them to do more than their share of the day's work. Power steering on wheel type is available if desired.

Let your John Deere industrial dealer fill you in on the many qualities of design and construction that make these tractors so suitable for the rough, tough everyday jobs of the modern builder and contractor.



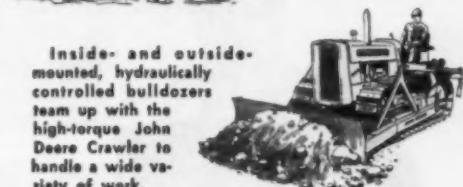
Completely Engineered for Industry

The highly mobile new "440" Wheel Tractor is ideal for construction and maintenance work of all types.

A new, complete line of John Deere quality-built working equipment matches the "440's" to the construction job.



Deep-digging, highly efficient backhoes . . . power-operated trenching units . . . and fast working scrapers are available for both crawler and wheel models.



Inside- and outside-mounted, hydraulically controlled bulldozers team up with the high-torque John Deere Crawler to handle a wide variety of work.



Heavy-duty front-end loaders with rear-end scarifiers make fast work of earth moving. Exclusive clutch-type direction reverser saves time, effort on many jobs.

Your John Deere industrial dealer can tell you of the many other types of equipment available for use with John Deere Industrial Tractors.

For Further Information Write: JOHN DEERE INDUSTRIAL DIVISION • MOLINE, ILLINOIS

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New Publications

The proceedings, 36th annual meeting of the Highway Research Board, held in January, 1957, has been published and distributed to members.

Dedicated to Thomas H. McDonald, the 834-page volume includes scores of papers on the technical aspects of highway engineering and construction—economics, finance and administration; design; materials and constructions; maintenance; traffic and operation; soils; also minutes of the 1957 annual business meeting of the board.

For a copy, address the Highway Research Board, 2101 Constitution Avenue, Washington, D. C.

CONCRETE PAVEMENT TEST PROJECTS, CONNECTICUT AND INDIANA. Bulletin 165 is the first of two reports on a 23-year test period, under traffic for concrete pavements built for experimental purposes in these states.

Price \$1.00. The Highway Research Board, 2101 Constitution Avenue, Washington, D. C.

MANPOWER POTENTIALS IN HIGHWAY ENGINEERING. Bulletin 164, Highway Research Board, 2101 Constitution, Washington, D.C. Price \$1.20.

This bulletin contains five papers presented at the 36th annual meeting of the board in January, 1957.

CONCRETE PAVEMENT TESTS. Bulletin 165, Highway Research Board, 2101 Constitution, Washington, D.C. Price \$1.00.

This bulletin describes two test projects, in Connecticut and Indiana. Data reported are of value to highway designers and economists.

BUREAU OF PUBLIC ROADS, Annual Report, fiscal year 1957. 86 pages of statistics and review data on the bureau and its direction of the nation's federal-aid highway program. Price \$30. Superintendent of documents, U. S. government printing office, Washington 25, D. C.

HIGHWAY TRANSPORTATION LEGISLATION IN 1957; Part I, Highway Laws. A summary of federal and state activity, prepared by J. Allyn Preston, legal research specialist, National Highway Users Conference.

ence. For a copy, address the foregoing Conference, National Press Building, Washington 4, D. C.

McHenry New ACI President

Douglas McHenry, director of development, Research and Development Division, Portland Cement Association, is president of the American Concrete Institute for 1958. He succeeds Walter Price, Director of Engineering Laboratories, U.S. Bureau of Reclamation.

The American Concrete Institute is a national non-profit organization formed to gather, correlate and disseminate information for the improvement of the design, construction, manufacture, use and maintenance of concrete products and structures.

Mr. McHenry, who has served for the past two years as vice president of the ACI, has held the PCA laboratory post since 1952. For twelve years prior to that, he was with the Bureau of Reclamation in Denver where he served as head of the Structural Research Section of the Engineering Laboratories Branch and later as head of the Concrete Laboratory Section.

McCarthy Auger Drills...



Heavy-Duty Vertical auger drill gives you more profit per job by drilling from 3 to 24 in. diameter holes 400-800 ft. per day.

Trench-type auger drill speeds pipeline work by drilling under roads, RR beds; readily equipped with pipe-pusher.



....for
EVERY
PURPOSE

These two McCarthy Auger Drills speed work and cut costs in a variety of contracting jobs—blast hole, foundation and deep post hole drilling, dewatering, exploration; and underground pipeline installation. Bid lower, work faster and profit more with these two great McCarthy Auger Drills. Contact your nearest representative or write direct for Bulletin M-100 (vertical) and Bulletin M-107 (trench-type).

Manufacturer of Drilling



Equipment Since 1901

THE SALEM TOOL CO.

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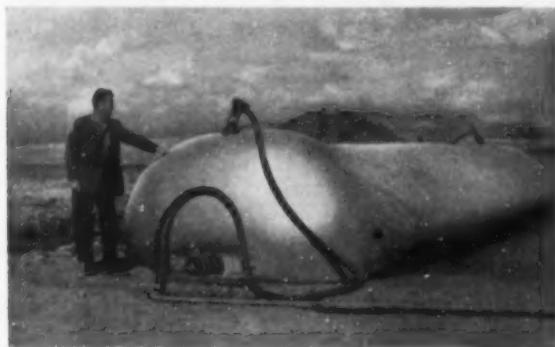
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Collapsible Tank Has 15,000-Gal. Capacity

Highway contractors working far from supply sources will look with interest on new lightweight rubberized fabric tanks which are completely collapsible.

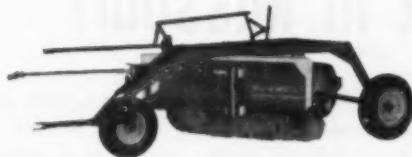
Called "whales" because of their size and shape and manufactured by Firestone Tire & Rubber Co., the tanks have a capacity of 15,000 gal. and have been used with success in the oil fields of the southwest. They can be rolled up into a package eight ft. long by 2½ ft. in diameter and weigh approximately ½ that of a steel tank with comparable capacity.

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• The "whale" in use, above.

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ROADS AND STREETS, April, 1958

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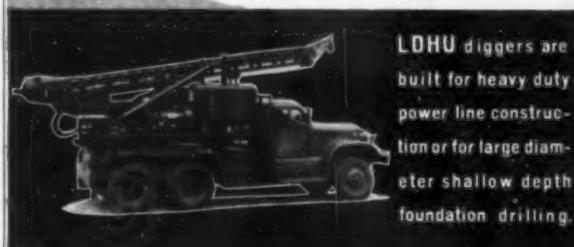
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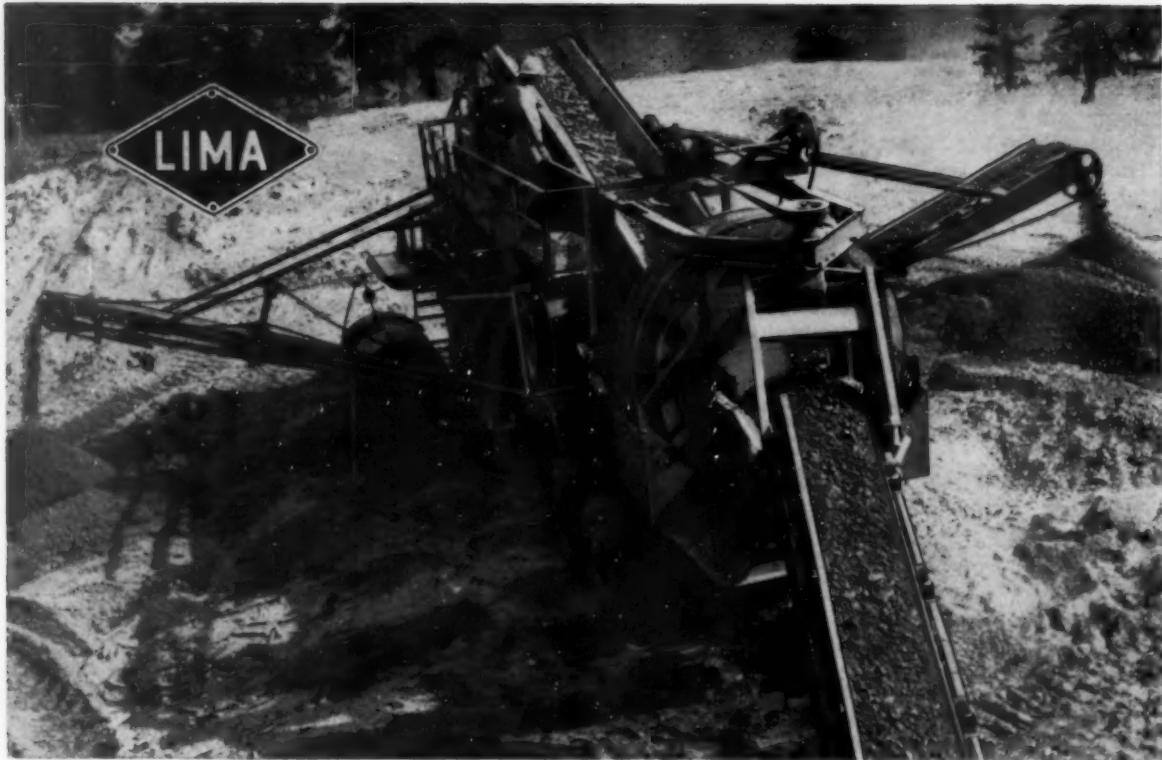
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roll crusher, 30-in. conveyors, and a 4 x 12-ft. inclined, positive-throw type vibrating screen. It may be had with either a shovel-loading hopper or a swivel drive for feed conveyor. It is a completely self-contained unit that can be transported over most highways without special permit.

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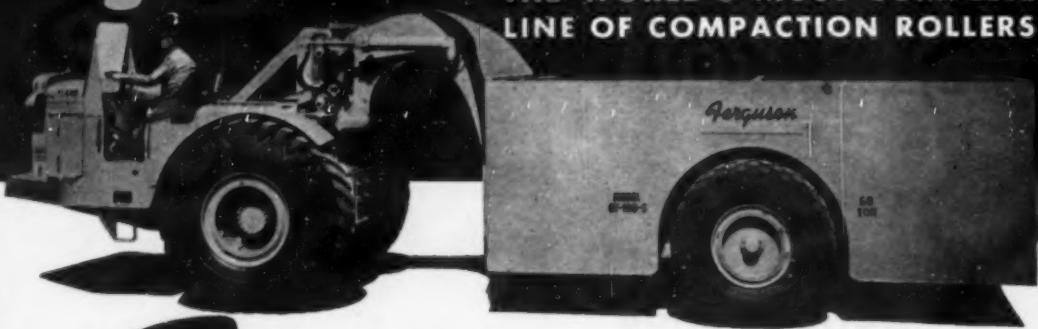
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54

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ROADS AND STREETS, April, 1958

Water and Aggregate Supply

"Big Business" on This Jumbo Job

By H. K. Glidden
Contributing Editor

Deep wells drilled for compaction of thirsty soil. Aggregates alone were a million dollar item on Morrison-Knudsen's 18-mile relocation project on Wyoming U.S. 30.

ARE THE CONTRACTOR'S PROBLEMS basically any different on today's jumbo-sized highway projects—say one involving reconstruction of 18 miles to form a modern expressway—compared with the usual 5 to 10 miles of ordinary highway?

This question comes to mind as one looks over the problems and procedures of one of Wyoming's largest road contracts. We refer to Morrison-Knudsen Company's project on U.S. 30 between Wamsutter and Rock Springs, Wyoming. The existing roadway will be converted to modern Interstate dual highway standards at a cost of \$4,782,000. The contract was awarded in April, 1957, with a 300 working day time limit.

Similar questions are being asked by both contractors and highway department leaders with increasing frequency these days. Such thinking must result from planning for the forthcoming multi-billion dollar Interstate highway program. The urgency of the entire highway program is often forcing the awarding of bigger projects in one contract.

- Marlow model 1061 centrifugal pump powered by a Chrysler industrial engine is shown loading 6,000 gal. Euclid-drawn tanker from bulldozed storage pond.



• A 4,000 gal. converted-Euclid water wagon is seen wetting select surface material. One of many big water rigs.





● Getting out the rock. Cat D6 mounted Porta drill using Varel VID No. 1303 bits is downdrilling 6-in. holes while two carrier-mounted drills using Timken carbide insert bits run lifter holes horizontally into the toe of the slope.

Projects with a \$5 million price tag may have become common in the more populous states, but the M-K job represents something relatively new to Wyoming, a state which is out ahead in its Interstate program. This project has created interesting problems of "logistics" of supply. Water is the one which set this job apart from many others, with aggregate production a close second. Plant-mix surfacing alone is an item running well over a million dollars. Project operations during the 1957 season were spread over 60 miles.

How Water Supplied. Water for compaction of the 1,952,000 cu. yd. of unclassified excavation and

● Chevrolet 6500 flatbed serving as a lube truck. Carries an Ingersoll-Rand 101 DG compressor, 5 air-connected barrels, Lincoln 4-in. diameter Air-motor 81530 lubricant pumps, and 6 hose reels. Seen servicing LeTourneau-Westinghouse scraper.

462,000 tons of selected surfacing materials took some scheming in this region of extremely low annual rainfall.

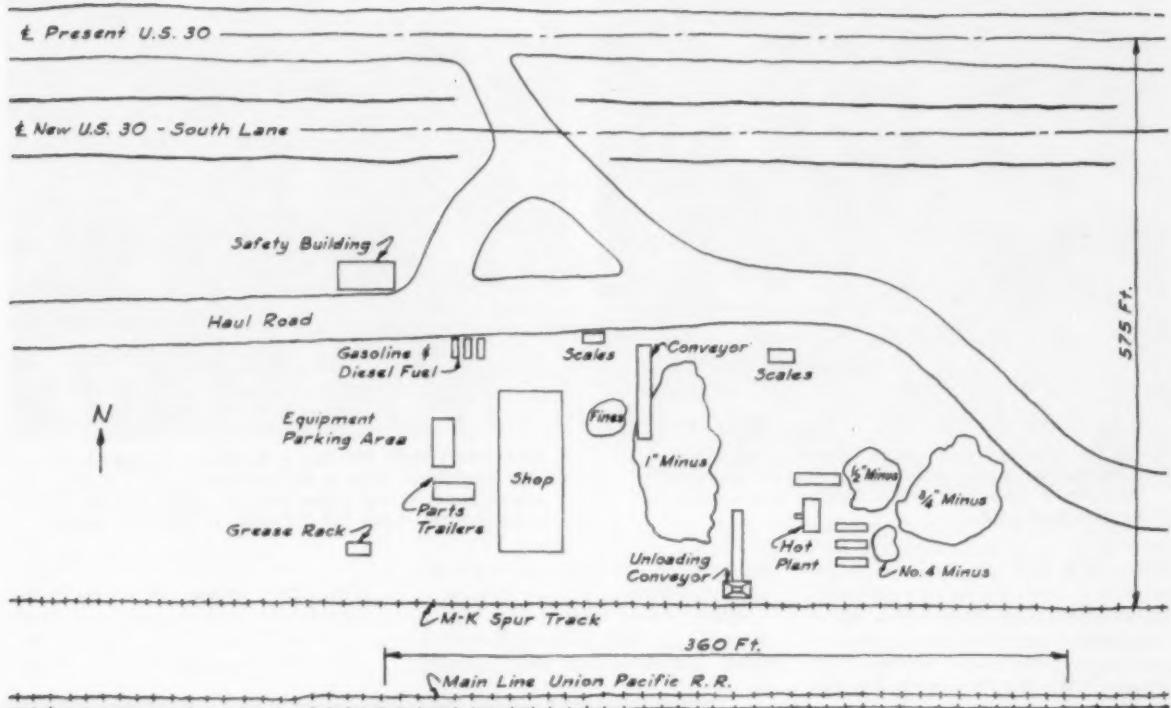
The contractor's investigation showed water to be available from three sources—run-off from rain and melting snow; deep wells; and by purchase from the Union Pacific railroad. Availability at the right time in sufficient quantity and at reasonable delivered cost were the problems.

Rain and snow occur hereabout almost entirely in winter and early spring, supplemented by flash flood thunderstorms throughout the summer and

fall. The numerous watercourses criss-crossing the rugged desert terrain are dry except for the spring run-off. The parched sage-brush-covered soil sheds rains with little percolation. If run-off is to be stored, it must be impounded immediately. On the favorable side, the soil is tight and holds water well. On the bad side, the hot dry winds cause a high rate of evaporation, making pond depth desirable so as to reduce surface area.

Run-off water for this project had the advantage of being cheapest if it could be impounded close enough to the job. Sev-





● Schematic layout (not to scale) of Morrison-Knudsen's shop and hot-mix plant area.

eral dams were built with this in mind. The largest was constructed across a large, dry watercourse near Red Desert, as shown in an accompanying photograph. M-K supplemented the natural runoff by the subsequent drilling of a deep well at one end of the dam and pumping into the reservoir. Pumping from the reservoir directly into water trucks was undesirable because of a blind crossing of the extremely busy double track main line of the U.P.

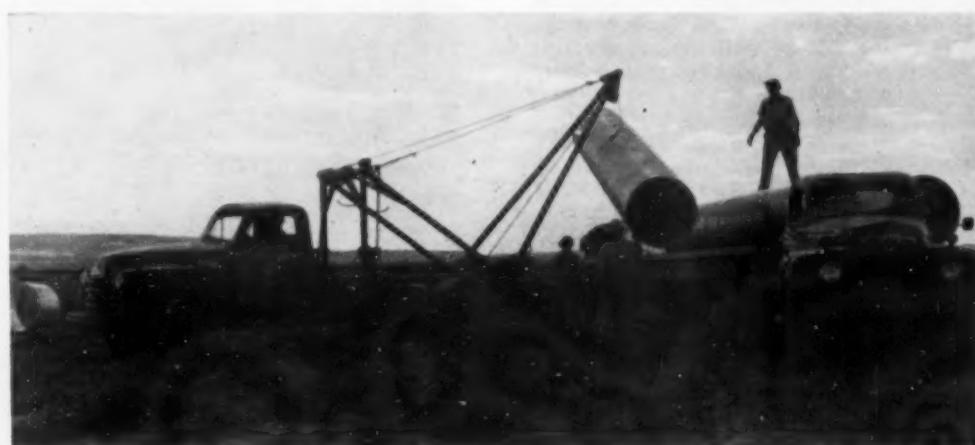
To reduce the number of crossings per day as well as to reduce costs on the long haul, water from this reservoir was hauled to the project in two 7,000-gal. gasoline transport tankers. The tankers emptied the water into any one of several 50,000-gal. ponds which the contractor had bulldozed at

convenient locations. The tankers loaded in about 5 minutes, but it took from 20 to 25 minutes to unload by gravity. The bulldozed ponds were about 8 ft. deep and proved to have a low percolation loss. Each pond was provided with pumping facilities for loading water wagons.

The second method of taking water from the Red Desert reservoir was to pump it over the dam into the stream bed, to flow past the U.P. tracks to a smaller reservoir along the highway.

A most ingenious installation of dams along the right-of-way impounded the water, mostly flash flood run-off, from a drainage area which emptied into the roadside ditch. Since the fairly level terrain limited the height of the dams they were bull-

- A truckload of Armco corrugated metal pipe being unloaded at culvert location. Ford Big Job F-8 tractor is pulling a 40-ft. Trailmobile trailer for hauling pipe, and a Chevrolet 6400 truck carrying a Tulsa winch is unloading.





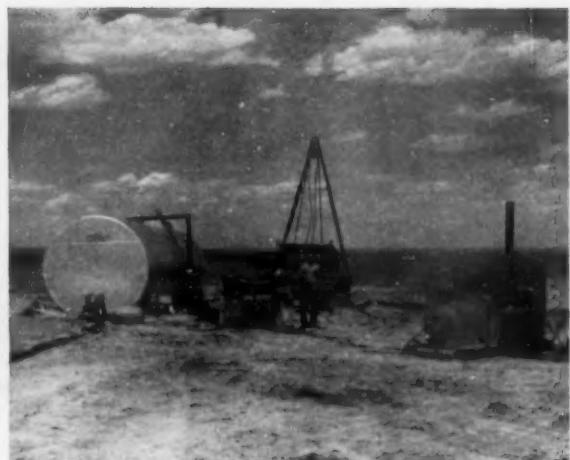
● At the base material plant, Hewitt-Robins 3-deck Gyro screen is seen at the left. Operator electrically controls a dual feed while loading tandem truck-trailer haul units.

dosed in a U-shape. In order to be certain that all available water was impounded, the upper dam spillway was connected to a similar reservoir immediately below. This supply was supplemented by the drilling of two deep wells. These reservoirs were about 300 ft. long by 150 ft. wide and had an average depth of less than 5 ft.

Water for the Western end of the job was produced from wells which M-K drilled on public lands. The government agencies were glad to have public lands improved by the drilling of wells. (On the other hand, this area is used as winter range for pasturing sheep and the sheep men were reluctant to allow any development of water resources whatsoever. It was the supposition that the sheep men feared that any improvement in this arid land might make it attractive for homesteading or farming purposes and thereby ultimately deprive them of grazing land.)

The contractor's wells ranged in depth from 250 to 1,100 ft. deep; the shallow wells proved the best producers. About 100 gal. per min. was pumped into a 2,700-gal. storage tank, centrally located in regard to the wells. A 40-hp, electric-motor-driven Berkely model 2EP-2 pump forced the water through five miles of 4-in. pipe to on-the-job storage tanks. A Murphy Diesel model ME-475 KVA generator plant provided

- Cross-shaped crusher set-up worked on basis of recirculating material until it passed 1 in. finishing screens in the center, before being transported to finishing bin. Trucks haul aggregate for railroad shipment to point near job.



● Five desert wells fed into a 2,700-gal. storage tank (see drawing). Here a Murphy ME 4 75KVA generator powered well pump and 40 hp Berkeley 2EP2 pump pushed water 300 ft. uphill 5 miles to tanks.

current for operating the well and pusher pumps.

Water from these wells was delivered by the 4-in. pipeline to three 8,000-gal. tanks near the mid-

dle of the west end of the project. The three tanks were connected together by an 8-in. manifold which terminated in a downspout and valve for loading trucks. These



● Especially built crushing plant featured mobility. Seen here is trailer-mounted Allis-Chalmers cone secondary crusher.

tanks were installed on top of an 8-ft. high bulldozed fill built for this purpose. A depressed ramp was dug for loading the trucks.

The contractor had eight large-capacity water trucks on the project. Part of the trucks had pressure spray bars while the rest were gravity bars. The contractor took all steps possible to get water mixed in with the soil or aggregate as fast as possible to minimize evaporation loss. Motor graders followed the water tanks closely, blading the material back and forth to get the water and soil thoroughly mixed. In addition to water required for compaction purposes, there was a great need of water for maintaining the desert haul roads.

● *Aggregate Production.* Crushing and screening of some 200,000 cu. yd. of stone for base course and asphaltic mix is being performed in



a limestone quarry near Rawlins. This site, chosen following a search for a suitable aggregate source, has produced good stone but has been a special headache to the contractor. Quarrying operations are complicated due to the steeply tilted

limestone strata. The 80-degree dip has greatly complicated both overburden removal and blast hole drilling.

To open up the quarry, holes for lifter shots were drilled horizontally into the tipped strata at floor level. As much as 60 ft. of overburden was removed in these shots. Holes were put down with an Ingersoll-Rand drill (2 1/8 in. bits) and a Gardner-Denver Air Trac (3-in. bits). Due to the high overburden and the slant of the seams, there is some difficulty in placing enough of a charge to shatter the rock thoroughly; the rock came out fast, but some secondary blasting was necessary.

Subsequent drilling has been down-hole, using a Portadrill unit mounted on a Cat D6 tractor. This drill produces 6-in. holes on a 12-ft. pattern at the rate of about one foot per minute. The down-holes are supplemented with lifter shots under the face of each lift, to blast stone too near the ledge for safe operation of the tractor-mounted drill.

Blasting is done with a combination of Hercules stick and bag explosives, generally about 0.5 lb. per cu. yd. of rock, ledge measure. Blasting caps are used for some of the production, going to Primacord after the quarry procedure has been worked out. Delaying caps are employed where circumstances suggest need to control throw or where better fragmentation is desired.

Crushing and screening is done in a plant devised specially for the project. Quarry rock loaded by a Northwest 80D shovel and delivered by Euclid end-dumps is fed by conveyor into a Universal 3042 jaw

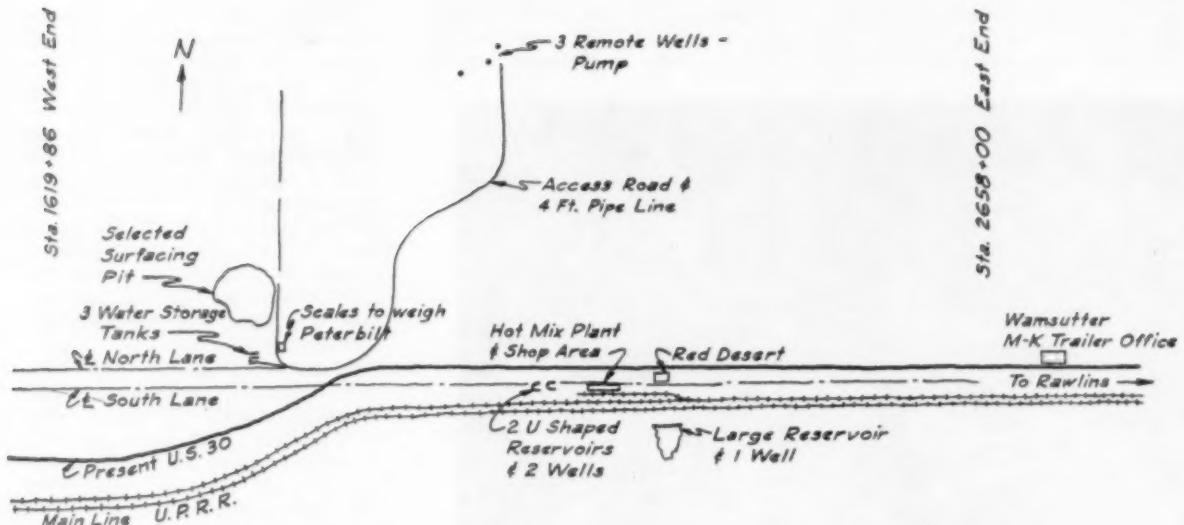
(Story continued on page 61)





- Bulldozed ponds were filled with water hauled in 7,000 gal. gasoline transport trucks and trailers pulled by Autocar tractor trucks.
- 5,000-gal. gravity-feed water wagon proved effective, but required careful driving on slopes.

Water in Huge Gallonages on M-K's Wyoming Job



- Sketch of a larger area along the M-K project on U.S. 30 Wyoming (again, not to scale), showing select surfacing pit, scales and well areas, etc.



- Roadside reservoir, bulldozed in the sagebrush, stored water from two drilled wells. Cat D3111 electric set furnished current for Peerless deep-well pumps. Chrysler industrial engine powered Marlow 10-in. centrifugal for tank loading.

Interstate Projects

— One of a Series

(Story Continued from page 59)

crusher. Material is then passed by conveyor to a centrally located Robins Gyro Screen (three decks). The top deck removes all 2 in. plus material which is then conveyed to an Allis-Chalmers cone crusher, then back to the top screen. All material passing the 1-in. bottom screen is conveyed to the finished aggregate bin.

All material retained on the bottom screen is conveyed to a set of Pioneer 954 rolls, then recirculating back to the screen. Recirculation is the basis of the entire scheme, in that material is screened and rescreened until it passes the bottom screen and goes to the finish bins. The bulk of the material is finished after one pass through either the cone or roll crusher. However, it was anticipated that some of the stone would run through the cone and rolls more than once.

All belt conveyors and bins were manufactured by the Idaho Sprocket and Machine Works. This company also built the trailer for the cone crusher. About 2000 tons of crushed aggregate is average daily production for this plant.

Finished aggregate is hauled to rail siding in tandem rigs consisting of Mack B63 Thermodyne trucks with Williamsen bodies and Peerless F2P2HS trailers of 14 ton combined capacity. Cars are loaded by dumping into a hopper feeding a conveyor belt, and are unloaded by a reversal of the loading process.

On being unloaded, the aggregate is either truck hauled directly to the base or stockpiled. There are two stockpiles; one for storage of

• Three 8,000-gal. tanks stored water, pumped 5 miles.



• Select surfacing material, 30 tons per load, was hauled in Cook bottom-dump trucks pulled by Peterbilt tractors. Outfit is seen being weighed on Murphy scales.

base course and the other for asphaltic mix. In both instances, large diameter (10 ft.) Armco Multi-Plate culvert pipe serves to house 30-in. tunnel belts. On a typical day, 43 70-ton carloads of stone are required to keep the big asphalt plant supplied.

Mineral filler to correct the hot-mix gradation is produced in a separate plant and also supplied by rail.

The wearing surface of hot plant mix is being produced with a Cedarapids Model MMA plant (Cedarapids' largest, 240 tons per hour). Paving work began in the 1957 autumn and will continue in 1958, using two Barber-Greene finishers, a Buffalo-Springfield Model 2404 9-ton 2-wheel for breakdown, large rubber-tired rollers for kneading and a Buffalo-Springfield Model KX25D 3-wheel for finishing.

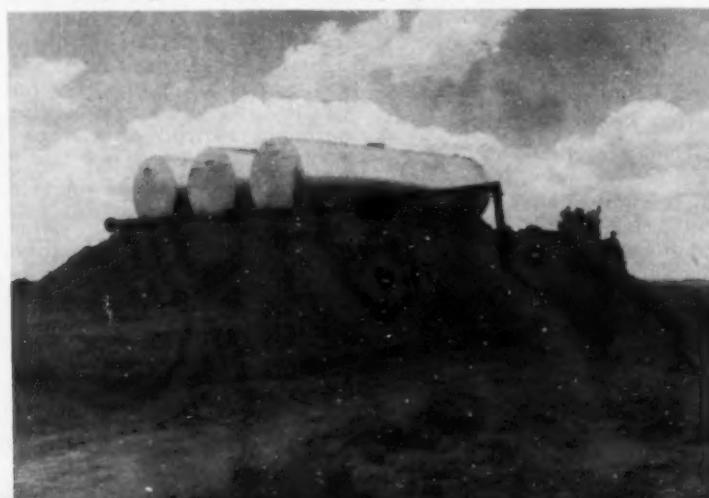
A few notes on other aspects of this project, which involves a segment of Wyoming's east-west tourist "main line." The easterly 11 miles

of the project coincides with the present road, which will carry traffic until 1958, when the new parallel roadway will be done and traffic can be diverted for completion of the dualization. The remainder of the job is on new location, and therefore has entailed no traffic handling problems.

Right-of-way for new location was thoroughly cleared of rubbish for all excavation and fill areas. Disc harrows were used for breaking up sage and weeds, which were gathered by a rotary hay rake in windrows and burned. All areas were watered and sheepfoot rolled prior to filling. A 50-ton rubber-tired compactor was the chief rolling tool for fills.

Completed grades were topped out with varying specified thicknesses of selected granular material. This material was of greater thickness on the outside traffic lanes, tapering to a thinner lift at the inner pavement edge. The basic thickness design was determined

• Pettibone-Wood Preparer model P-640 was used to process select base material in place.





● Seaman Pulvi-Mixer is seen mixing water into select surfacing material.



● Morrill side-delivery rake, Model M-5, pulled by a Case farm tractor windrowed trash for easy burning along the right of way.

Main Bid Items on Wyoming U.S. 30 Project

Watering	76,750 M gal.	4.00
Excavation, unclassified	1,952,000 cu. yd.	0.27
Selected surfacing material	462,000 tons	0.53
Crushed stone 1 in. max. (base course)	199,600 tons	4.00
Mineral filler for base course-hot-mix	88,750 tons	2.50
Asphaltic cement 85-100 pen.	11,300 tons	33.00
Plant mix surfacing (Including haul)	179,810 tons	5.90
Salvaged surfacing material	81,000 cu. yd.	0.74
32-in. woven wire fence	200,000 lin. ft.	0.33
Sheepsfoot rolling	700 hours	13.00
Pneumatic rolling—50 ton	1,750 hours	14.50
Hauling select surfacing material	2,054,300 ton miles	0.08
Hauling excavation	759,000 cu. yd. miles	0.17

from California Bearing Ratio readings on the subgrade.

Select material for base was shovel loaded from a pit along the job, and hauled the considerable distances in 30 to 35-ton loads, using Cook over-road-type bottom-dumps first developed in Southern California and Peterbuilt tractors. Moisture was mixed in by Seaman Pulvimeter. A Bros preparator and a similar machine were used at times to break up oversize material in the windrow. Following blading out in thin lifts, the material was rolled with a 50-ton compactor.

Under a bid item considerable yardage of old blacktop pavement is to be salvaged and reused as fill or select base material on this job.

Seeding methods for this arid, wind-blown country are worthy of passing note. A contract item is seeding of 180 acres (at \$80 per acre), along with 360 tons of straw (\$360 per ton), and 700 tons of MC-1 asphalt (at \$39.00). Straw and seed are disced in to make a mulch, and the asphalt sprayed on to hold until a ground cover can be sprouted. The success of this

effort is expected to hinge on the amount of rainfall in the 1958 season.

Cecil Amick is project manager for Morrison-Knudsen Co., Inc., R. A. Healy general superintendent, Thomas Cushing office manager, Ellis Bunn crusher superintendent, J. Thomas hot plant superintendent, and Marion Gettys safety supervisor. The job is under M-K's Wyoming Area manager, R. E. Denham. W. D. Whitlock is project engineer for the Wyoming highway department, under district engineer John A. Atkins at Casper.

Blasting Cap Accidents Need Operating Room Technique

Accidental detonation of explosives, one of the most violent causes of death or injury, is not confined to the battlefield, asserts a noted insurance surgeon.

The boom in highway construction will bring increased use of explosives, Dr. N. Gillmor Long, chief surgeon for Lumbermens Mutual Casualty Co. and American Motorists Insurance Co., says.

"The storage and handling procedures of blasting caps will be the main source of explosive danger to both children and adults near work sites," he says.

Dr. Long suggests blasting caps be handled with the certainty of operating room sponges.

The Federal-Aid Highway Act of 1956 has authorized more than 33 billion dollars to be spent on the Interstate highway systems through 1959. "In such huge construction jobs there are bound to be blasting cap injuries ranging from disintegration and evisceration to blindness and mutilation of limbs," Dr. Long warns. "Lost blasting caps can pave the road to ruin for anyone unlucky enough to find them and unwise enough to handle them."

"Some danger in this huge road-building program will result from certain uncontrolled blasting procedures and, in some cases, the use of a poor type of cheap explosive," Dr. Long predicts. "The direct bodily effects from actual blasting procedures can be minimized by proper safeguards of inspection and protection before and during construction-demolition operations."

"Actually, this does not constitute the total problem. The basic dilemma lies in the careless storage and handling of blasting caps. The unexplained loss of a single blasting cap should cause just as much concern and construction as would a missing gauze sponge at the end of an abdominal operation."

Dr. Long states that all operating rooms have twelve sponges wrapped together in each package which are carefully accounted for before and after an operation. If we are to avoid accidents, he says, blasting caps should be handled in a similar manner.

READY-MIX AND HIGHWAY PAVING

ONE of the most timely subjects reviewed at the American Concrete Institute's annual meeting in Chicago was the place of ready-mixed concrete in the highway program. Notes on this session are carried in this issue, and next month a staff review of state highway department practice on ready-mix will be published.

The ready-mix companies can well be concerned today because of the huge market for their product that is at stake in the immediate period ahead. Commercial producers are already enjoying a very large volume of business for city street work, curb and gutter, and structures of all kinds including highway bridges and grade separations at rural locations.

Yet in painful contrast, state highway department engineers simply have not found a way to secure concrete pavement of the quality expected out of present-day truck mixing, delivery and handling procedures. The problems range all the way from guaranteeing good slump control and finding means of depositing loads more uniformly between the forms, to the overall problem of maintaining a very rapid delivery of concrete to keep up with the spreader and finisher.

The ready-mix industry, we predict, will find ways to ease many of these obstacles, and to make ready-mixed concrete increasingly competitive with paver operation. But the change will not come about overnight. Concrete pavement prices, whatever the placement methods, are high today in relation to past years due to many factors including of course inflation. All equipment manufacturers have a common problem of helping contractors devise ways to lay pave-

ment with maximum job efficiency, while maintaining the high standards of uniformity and precision construction required of concrete today.

Coming back to ready-mix, we wonder whether the contractors have been given enough of a chance to help figure out some new answers. They won't take much interest unless the highway department engineers also bring open minds to bear on the job difficulties. The engineers and contractors might well cooperate on worthwhile experimental techniques, especially of placement.

Briefly Noted . . .

Anyone who has ever driven over one of our big toll roads, will recall the pleasant sheltered feeling from knowing that a police car will happen by soon and radio for help, should you have mechanical trouble or other distress.

Some of the toll road agencies have fire apparatus, nearby hospital arrangements, and other emergency procedures for any situation. And advice is given at the collection booths as to where to find motels.

The question of just how much public service of this kind the motorist should expect on an Interstate freeway has never been settled. Certainly the state highway departments must introduce a fresh concept of operation and maintenance for the Interstate system.

For this reason much interest is being shown in a series of ten regional seminars, planned during the next twelve months by The Institute of Traffic Engineers on free-way operation and maintenance.

The value of an express highway,

plowed free of snow and ready to carry you through was dramatically demonstrated in February during the freak storm which hit northern Indiana.

While 30 or 40 inches of snow dropped onto the highways of the area, and closed all roads for a considerable period, the Indiana Toll Road enjoyed a record-smashing business. A total of 4,087 trucks and busses used the highway on February 18, producing the highest single day receipts since the road was opened in 1956.

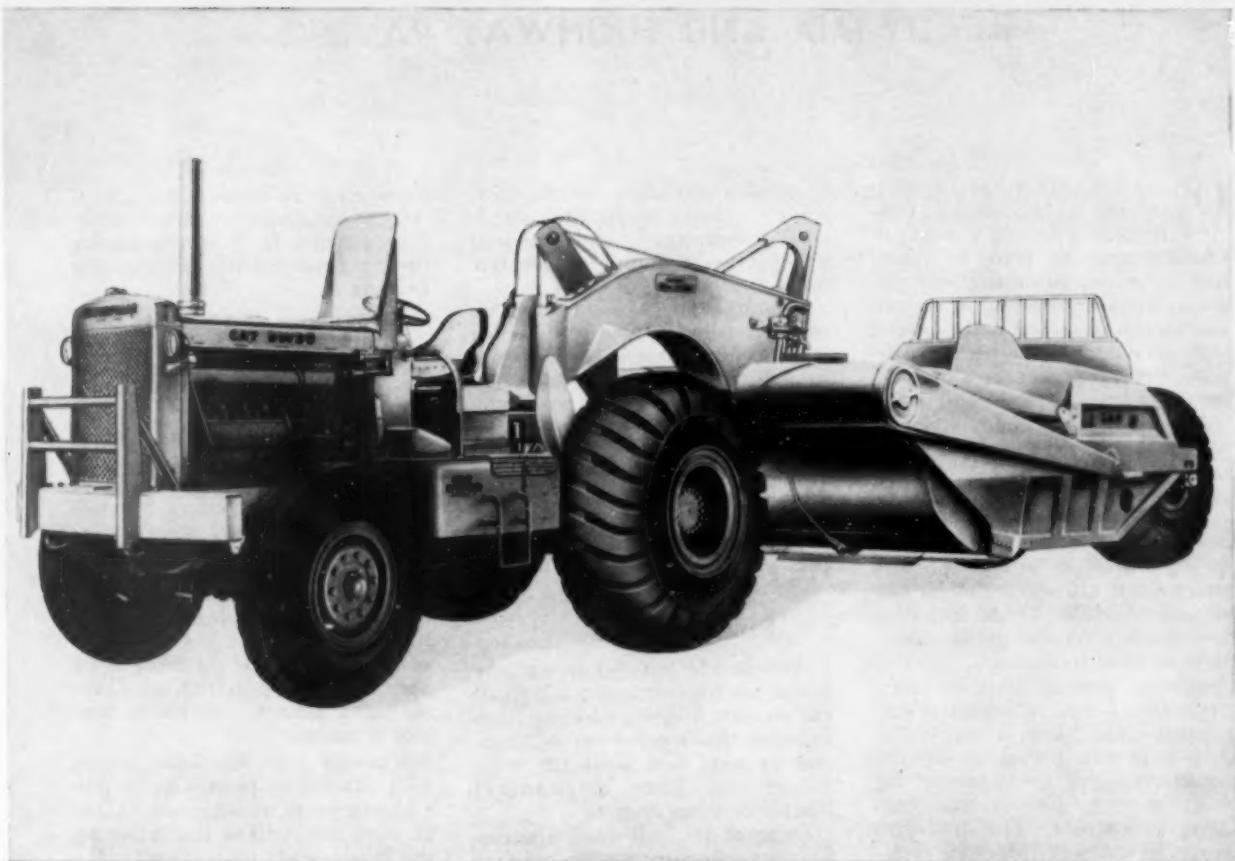
Road building, they say, should never be too completely divorced from politics. This is no problem in Michigan, where the latest is an open letter by State Highway Commissioner John C. Mackie to Senator Smeekens.

It seems that Smeekens joined with Mackie in promising to put a high priority on improving U. S. 27 from the Indiana line north to the Straits—a \$15 million undertaking.

"However" states Mackie, "if Senator Smeekens continues to support a proposed raid, which would divert \$6 million to pay the State Police, the Road Department might well not be able to deliver this promise."

"I find last May," continued Mackie, "that the Senator obtained 25,000 official highway maps from our department without paying for them, turned them into handbills, by placing his picture and name on them, and gave them away to further his political ambitions. . . . The highway department under my administration will no longer help finance his political career at the taxpayer's expense."

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New HP—320 (maximum output)!
New Torque—28% torque rise!
New Speeds—up to 35.8 MPH!

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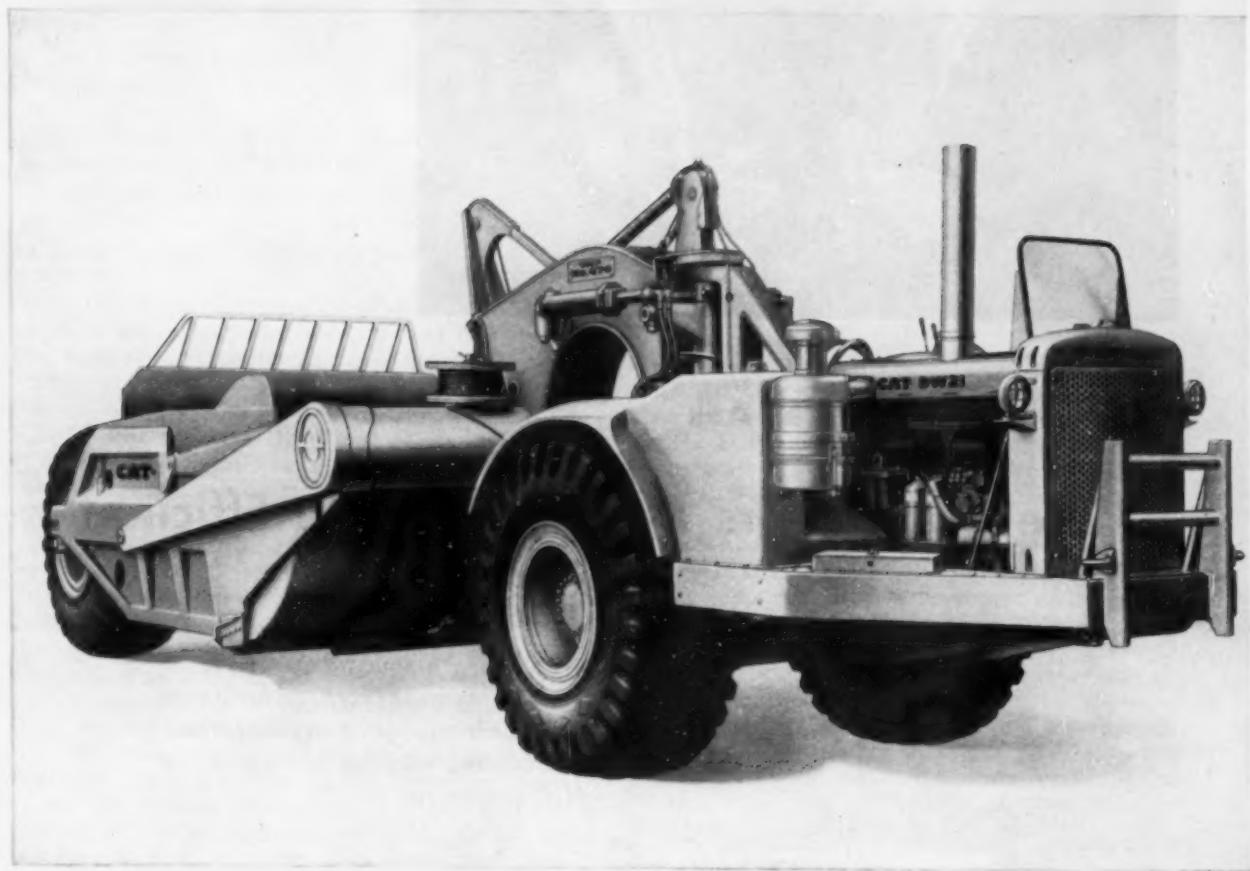
Behind the new performance of the new DW20 (Series F) and DW21 (Series D) is their new SUPER-TURBO Engine. This amazing power plant incor-

porates a new concept in diesel engine turbocharging. Its heart is a revolutionary air induction system, unique in earthmoving machines . . . and another Caterpillar first.

This system allows use of more of the Turbocharger's potential than was possible before. Results: twice as much torque rise, higher horsepower, better acceleration and gradeability.

But more important, these results translate into faster cycles, greater production and more profit—for you.

NEW INCREASED HORSEPOWER



DW21

(SERIES D)

New HP—320 (maximum output)!

New Torque—28% torque rise!

New Speeds—up to 22.6 MPH!

Add to these DW20 and DW21 power advantages all the design features of Caterpillar LOWBOWL Scrapers. These matched units are built to use the greatest possible loading potential of the new power in the tractors.

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Call your Caterpillar Dealer right now and set up a demonstration on a job of your choice. The

sooner you see the powerful new DW20 and DW21 in action, the sooner you'll start getting bigger returns from *your* wheel spread.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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—First in the Industry
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• Lester C. Rogers, of Bates & Rogers Construction Co., Chicago, Ill. turns the AGC presidency over to highway contractor Fred W. Heldenfels, Jr., of Corpus Christi, Texas.

AGC Leaders at Dallas Ask

Give Contractors a Chance To Be Efficient

Opportunities in the expanding highway program, labor problems, specifications, job payment practices, insurance and bonding, accident prevention—rolled together, these topics made up an outstanding highway session at the AGC convention.

By Harold J. McKeever, Editor-in-Chief of Roads and Streets

THE HIGHWAY program was the occasion for an unprecedented general session at the Associated General Contractors annual convention.

Meeting 2,500 strong at Dallas, February 10-13, the contractors whose firms do the bulk of the nation's construction showed little of the "depression" spirit that has marked some industry conferences in recent weeks. With a continued growth in road construction assured, the AGC leaders see a year which is likely to set still another record dollar high for roads and for total construction. (See *Washington News Letter* in this issue). Construction is indeed the "bright" segment of the nation's economy, with the highway program offering the most new opportunities.

• **Labor Problems in Forefront.** Urbanization of the road program has brought an intensification of the labor problems of the road contractor. Featherbedding and other restrictive practices which boost

construction costs were the subject of a press conference led by AGC's retiring president, Lester C. Rogers, and by Frank Rooney, labor committee chairman.

The Association, it was announced, has intensified its long campaign to secure full productivity of labor on construction. Under the AGC banner, the nation's construction employers have united to demand action from building and construction trade unions, in support of the principle of giving the public a full day's work for a full day's pay. This campaign will be carried on at the national level, through the International unions, and by the state chapters at the local level over the bargaining table.

Repeatedly union leaders have met with the contractors in the past and given lip service to the idea of reducing restrictive practices. But action has been virtually 100 percent lacking among these officials.

The practices over which AGC has declared war include such things as the following:

(1) Requiring skilled workers (carpenters, mechanics, operators, and others) to carry material from the truck into the job—work more economically done frequently by unskilled labor.

(2) Demanding a minimum of three days' pay for any job start (in some cases a full week).

(3) Changing clothes and going from the construction shed out to the work site, or returning, on company time.

(4) Slow-downs of various kinds below agreed or established production rates.

(5) Other work limitations which make it impossible for a man to do a man's work stint.

(6) Jurisdictional disputes among the different crafts.

(7) Limiting the number of pumps or compressors, etc., which one operator may handle, or the work area which he may cover for such equipment. (One man to each unit, merely to start it in the morning and stop it at night, is often required today, however small the unit.)

(8) Requiring an operating engineer on such simple units as a hot-air space heater, which any child could turn on by pushing a button.

(9) Requiring one foreman for each three operators or other skilled men; and a general foreman if five or more operators are used.

The cost of such labor practices has begun to be seriously felt in the road program, and in fact is credited as being a major factor in the much-publicized inflation of roadbuilding costs. Highway construction labor costs were up 4.9 percent in 1957, along with rising fringe benefits. Also a steel cost rise of 6 percent during the year reflected a rise in indirect labor costs. Yet the highway contractor's prices were up only 1.9 percent according to Rooney of the AGC labor committee.

Hope for Public Support

Full publicity is being sought to enlist public support of AGC's position of desiring to give maximum construction for the private or public tax dollar. Association leaders hope that some gains can be won from the unions while the public lime-light is still lingering over general union management practices.

Highway Division Activities. Under the chairmanship of AGC's highway contractor division head, W. Ray Rogers of Oregon, the division's Washington manager, J. M. Sprouse, reported on a busy year of activities. His report credits the collective effort of many individuals and groups, inside and outside of AGC, for helping to expedite the federal highway program. Sprouse reviewed the progress made to date in translating the 1956 highway act into contract jobs. And he predicted a further increase of 30 percent in construction contract volume on the federal-aid systems in 1958. Even with this further rise, on top of recent rises,

Wider Contractor Interest in Highways

The AGC's general roadbuilding session at Dallas in a sense reflects the fact that highway jobs today have drawn contractors from the building and heavy engineering field. These firms have brought needed experience and managerial talent into the fast-growing urban part of the road program. Expressway projects demand expertise in handling complicated structural and underground work, as well as grading and paving. The influx of contractors over to road work, in fact, has intensified competition for road jobs as certain other types of construction have eased recently.

there will be more than enough contractor capacity.

Incidentally, noted Sprouse's report, the contract method continues to include more than 99 percent of all federal-aid highway projects.

Highway maintenance repairs done by contract represent a large and growing market, said Sprouse. Over \$2 billion in such work was reported for 1956. This was divided \$752 million state, \$710 million county and \$508 million municipal work.

Accident prevention rose another notch during the year as an activity among AGC's highway contractor members. Some 953 members participated in accident prevention programs through their local chapters—a 20 percent increase in a single year. Several chapters now have over 100 members in the program, with the Michigan Road Builders again in the vanguard. (A separate report on the Michigan accident prevention program will be published.)

AASHO-AGC Joint Cooperative Committee. In a detailed report on the activities of this committee during 1957, M. Clare Miller, co-chairman, reviewed a four-point program through which effort is being made to ease the financial problems of contractors doing business with the state highway departments:

1. **Expediting Final Payments.** The committee urges a 60-day "absolute maximum" delay period in making all final payments. Pennsylvania and Massachusetts recently enacted laws for paying interest on money withheld, and Washington has a new law allowing execution of a bond to cover final payments. The \$450 million estimated funds currently being withheld from contractors on highway work is money that could, if released, be used to finance additional contract work, noted the report.

2. **Reduction of Retained Percentage.** Present AASHO general provisions call for retaining 10 percent of estimates until the job is half completed. A recent AGC survey shows that 32 states retain the 10 percent throughout the entire job, others a lesser percentage throughout. Only 14 states



Max Harrison



B. D. Tallamy

follow the AASHO recommendations. Improvements in practice have been made in a few states, notably Pennsylvania and California. The AGC committee recommends that the retainage be eliminated entirely where the job is on schedule and handled in a satisfactory manner, and a performance bond be utilized as the contracting agency's guarantee.

3. Payment for Delivered Materials. The AASHO is urged to set forth a uniform method of payment for materials delivered in good condition to the job site. The effect would be to aid in encouraging the highway departments to reimburse contractors sooner for such materials. While some states now pay promptly for stockpiled materials, the state agencies cannot receive reimbursement by the Bureau under the 1956 highway act without delay. Corrective legislation has been introduced in Congress in recent weeks, aimed at this situation.

4. Elimination of Retained Quantities. The AGC committee seeks to end the practice of retainage on quantities in place, as a custom that is adding to the cost of construction. Again, a performance bond is recommended as a better device, working to the advantage of all concerned.

Lump-sum bidding is another subject of cooperative review under the AASHO-AGC joint committee. Echoing the AGC's mid-year board meeting in 1957, Chairman Miller said that the subject has more recently been taken up at joint committee meetings, with the following "apparent findings:"

- Lump-sum bidding can often conserve engineering manpower, save time, and expedite contractor payments.
- Its use will tend to discourage inexperienced or irresponsible bidders from taking jobs without site investigation. Such bidders usually work through the trick of under-

No AGC-ARBA Merger

The door is closed for the present on the idea of merging the ARBA highway contractor division into the AGC highway division. So reported AGC president Lester Rogers at Dallas. He expressed regrets, while noting again the "mutual advantages for the two rival groups in joining together."

cutting current unit prices.

- Lump-sum bidding as a practice will be encouraged only in such states where administrative and engineering methods are in force which make the practice feasible. And only then for items where experiments have shown the procedure to be practicable.
- The lump-sum bid idea will be watched closely, so that best use of it can be recommended in any specific state when the time is right.

AASHO Viewpoint. The highway contractors' session at Dallas was addressed by C. R. McMillan of South Carolina, president of AASHO. He outlined administrative problems which concern the contractor as well as the engineer, since they affect the speed with which the road program can be accelerated. Chief problem, and one which has dismayed many highway administrators, is right-of-way. Land acquisition has been a source of unexpectedly high costs as well as delays, he said. The highway agencies need strong public support in their effort to get proper legal tools and land-acquisition procedures.

Labor Problems that currently affect highway work, particularly the Bacon-Davis act, were reviewed by an AGC staff representative. One of the special problems cited was the payment of owner-operators of trucks. Such men are used in great numbers by road contractors, and are usually classed as independents and paid by the ton-mile. The Labor Department however seeks to require that they be classed as employees and assigned an hourly rate.

This is one of several interpretations by the Labor Department which AGC leaders have declared to be "erroneous" and beyond the intent of the Bacon-Davis act.

Some improvement of procedures however can be pointed to in Labor matters, it was noted. For example,

Heldenfels, Texas Road Contractor, Heads AGC

Fred W. Heldenfels, Jr., prominent Texas highway contractor, is the 1958 president of AGC.

James W. Caudrey, building contractor of Seattle, Wash., is vice president, also for a one-year term.

The Associated General Contractors of America represents over 7,000 general contractors belonging to 125 chapters in all 48 states and Alaska.

Mr. Heldenfels, a partner in Heldenfels Brothers, Corpus Christi, Texas, was AGC vice-president in

1957. A native Texan, Mr. Heldenfels is an honor graduate in civil engineer, Texas A & M College. Heldenfels Brothers was founded by his father before World War I.

Mr. Heldenfels, Jr., has served as president of the Texas Highway Branch of the AGC for two years, and as chairman of the Texas AGC Executive Council which includes 15 Texas AGC chapters. He has also been chairman of the Highway Contractors' Division of the national association.

a poster provided by the Bureau of Public Roads, intended to be displayed on all Interstate job sites, invites workers to "call any failure to receive any required wage rate to the attention of the contracting agency (state highway department) or the Bureau." Formerly such complaints were encouraged to go to the Labor Department, resulting in much red tape. Now very often the complaint can be settled at once on the site.

The highway session audience was told of a new payroll form contemplated by the BPR. This single sheet would provide for entering all the data needed to comply with federal requirements. The form is under consideration in the AGC chapters, and it is understood that a minority of contractors is strongly against it.

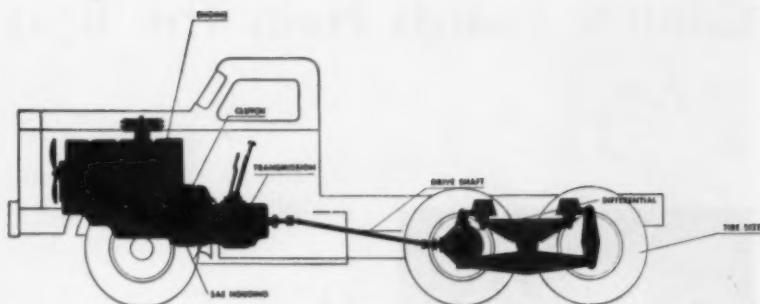
Tallamy Outlines Progress. Federal Highway Administrator B. D. Tallamy gave a chart talk to show specifically what progress has been made to date in translating the new road program into contract jobs; and how the Highway Trust Fund will limit the further growth in road building volume.

In telling of various administrative problems, he noted that the program had as a chief asset the integrity and ability of the great body of highway contractors. He spoke of the very few "who didn't belong in the program," and challenged the association to use vigilance in weeding out any dishonest elements.

One of the closing speakers was H. A. Radzikowski, Chief, Division of Development, Bureau of Public Roads. He told of the Bureau's intensified effort to bring about more uniform specifications. The existing variations in allowable speed of bituminous pavers, mixing time for concrete pavers, and other job procedures, were cited as examples of influences which still needlessly hamper the contractor.

"Shovel Productivity" Film Released by Bureau

Federal Highway Administrator Tallamy announced release of a new motion picture, "Power Shovel Productivity," produced by the Bureau of Public Roads. Based on extensive studies conducted by the Bureau, the film highlights conditions that determine the yardage output of power shovels on highway grading work.



Full Specs Needed in Ordering Transmissions

WHEN transmissions are ordered either for use with a new engine or for replacement purposes, detailed information on the specifications of the truck chassis or machine in which the unit is to be installed should always be provided in full.

Otherwise, the transmission manufacturer is confronted with the problem of identifying both capacity and construction of the transmission, according to advice from the Transmission Division of Fuller Manufacturing Company.

Capacity. In connection with the capacity of the transmission, the transmission manufacturer needs the following information:

1. Make and model of engine.
2. Maximum torque and horsepower output.
3. Reduction ratio of driving axle.
4. Tire size on both driving and steering axles.
5. Gross weight of truck or combination of tractor and trailer.
6. Type of service.
7. Tire size, both front and rear.

Construction. Replacement transmission must correspond to the basic specifications of the engine, clutch, parking brake, and universal joint arrangement. This is particularly important in a motor truck, because all these units are usually retained in the vehicle when the transmission is changed.

Normally, the construction of the transmission is resolved on the basis of the following:

1. S.A.E. size of engine flywheel housing.
2. Distance from the friction surface of the clutch flywheel to bolting face of the engine flywheel housing.
3. Make and model of clutch

which will be used.

4. Will parking brake be required? If so, identify the type, make and model. If band type brake or Fuller manufacture, identify the universal joint companion flange so that the correct drum may be provided.

5. Length to which the longer of the two clutch pedal shafts is to project from the clutch housing.

6. Will speedometer drive gear or corresponding spacer be used? Spacers corresponding to the length of speedometer gears can be furnished, but speedometer gearing must be ordered from the manufacturer.

7. If the vehicle is of the COE or cab-forward type, a remote control must be used. Normally, each transmission manufacturer provides remote controls adaptable to his transmissions.

8. If the nature of the cab requires bends in the gear shift lever and brake lever, sketches should be provided.

Only specially designed transmission equipment, normally produced on a tool participation basis, can be attached to some engines. Sale of specially designed transmissions is usually restricted to the truck manufacturer for which they were designed. Falling in this particular classification are the truck engines built by the following concerns: Ford Motor Company, GMC Truck and Coach Division, International Harvester Company, Reo Motors, Inc., and White Motor Company.

Although these concerns build truck engines with special flywheels and flywheel housings, S.A.E. standard flywheels and housings usually can be secured at additional cost.

Control Boards Help The Boss Keep Tab

How is Contractor Smith's job progressing? This board tells the New Jersey highway commissioner at a glance.



• Commissioner Dwight R. G. Palmer of New Jersey, retired corporation executive who is credited with applying many of the techniques of modern corporation management to the running of the New Jersey state highway department.

ONE of the problems of the commissioner or director in the large state highway programs of today is to keep a running picture of progress. As with a modern corporation president or board chairman, he is sorely in need of visual aids in this respect to help him get "quick pictures" and avoid reviewing reams of tiring paper work.

A device considered highly successful in this respect in New Jersey's state highway department management is what is called the Control Board. Commissioner Dwight R. G. Palmer has two in his office, one for the current

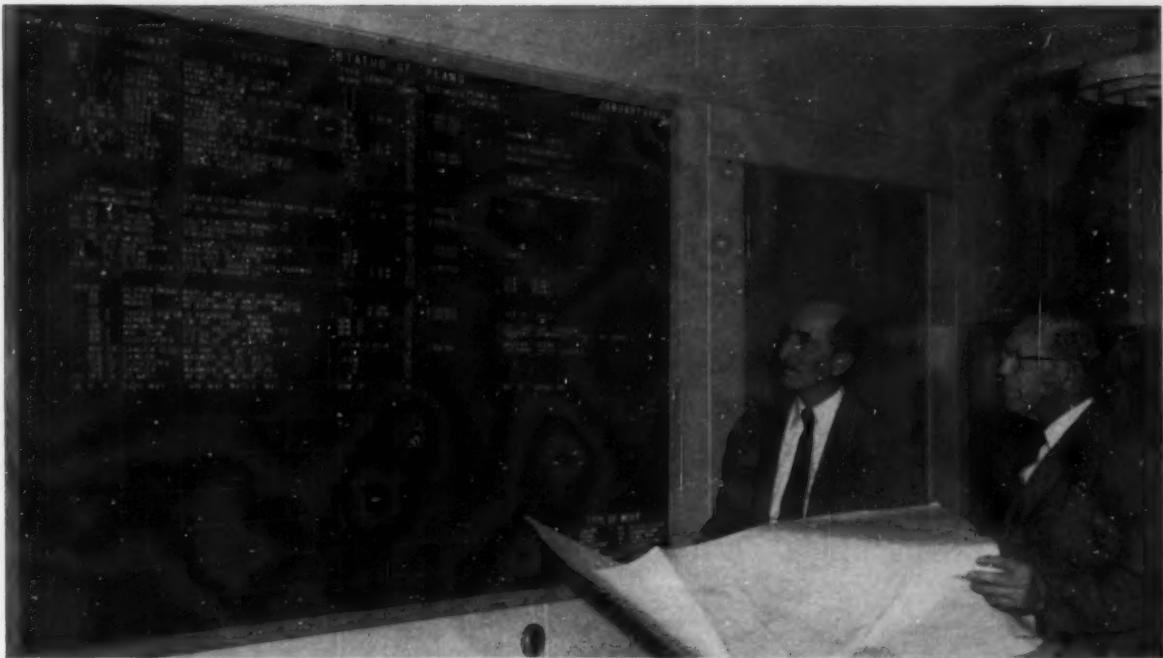
year's program and the other showing projects not yet completed but started under previous programs. Photographic reproductions are sent to all department heads each time the boards are brought up to date. Key department heads also have specialized boards of their own.

The commissioner's boards along with the others are corrected twice a month on the basis of job reports received from the Department's construction division. His master boards give the pertinent details of all contracts in active force.

By scanning the boards, Com-

• The master Control Board as displayed in Commissioner Palmer's office. It is kept up-to-date with twice-a-month changes.





• State highway engineer Otto H. Fritzsche and Harold W. Giffin, director and chief road engineer, consult control board showing status of construction plans for the current year's program. Control boards of varying types are in use throughout the highway department where they enable officials to obtain "at-a-glance" information.

missioner Palmer can run his eye from column to column, quickly noting the contract number, whether it is a federal aid job, the route number, the county in which it is located, the local name and description of the job, the type of work (by code letters), the contract amount, the revised contract amount, the estimated added cost for utilities and also for right of way, and the total project cost to date.

There are additional columns on the status of the contracts. For any job he can instantly check the starting date, the target completion date, the number of working days in the job, the number of days used, percentage of completion, and total days of delay.

The boards thus enable the commissioner to quickly detect trends. For example, one of the key problems is to see that the contractor is keeping on schedule. Supposing that a job with 130 days working time is 66 days done but only 20 percent of the work is completed, a quick glance tells him this, and a phone call sets the staff to investigating why.

The boards are reported to have taken the place of 60 different paper reports. While cutting down the amount of paper work by staff workers, the main purpose has been to enable the chief executive him-

self to be better informed and more effective in the use of his own time and energies.

Similar boards are maintained by division heads concerned with right of way, legal matters, planning and traffic, road design and bridges respectively.

Michigan Department Saving Through "Efficiencies"

More than \$1 million annually in economies will be effected through a 16-point program of administrative reform, adopted by Michigan's state highway commissioner John C. Mackie.

This rather startling claim made local headlines recently. Mackie's regime (he is the nation's only elected road chief), bases its claims on \$1 million in saving on highway survey work alone, through the gradual elimination of outside consultants.

Another \$100 thousand will be "saved" in reduction of overtime for department personnel. This will result from such items as improved controls; briefer language in bid invitation advertising; early bulk purchases of salt and calcium chloride, with water shipment where possible; better coordination between design squads and electronic computer operations (now stepped

up six-fold); saving in postage, in delivery of plans and proposals by parcel post; reduction in telegraphic charges; and use of a new photographic process in preparing construction proposals which eliminates much typewriter work.

Recently, up to 50 percent of all design work has been done by outside consultants. The current streamlining program in the department has reduced the number of paper forms from 556 to 135. Office managers have been appointed in all districts along with engineering clerks, to simplify paper work and take the engineering staff out of non-technical drudgery.

ACI-ASCE Recommendations For Prestressed Concrete

An important step in the technology of pre-stressed concrete is represented by the publication of tentative recommendations in *The Journal of The American Concrete Institute*, January, 1958. Representing the report by the ACI-ASCE Joint Committee, Number 323, Thor Germundsson, Chairman, this recommendation review occupies 32 pages of the Journal.

For further details, address American Concrete Institute, P. O. Box 4754, Redford Station, Detroit 19, Michigan.



Outside Camarillo, Calif., U.S. 101 is being relocated and improved. J. E. Haddock Ltd. is handling 5-mile project, moving a million and a half cu. yd.—mostly rock. Haddock moves about 7,000 cu. yd. a day.

Two of the three Caterpillar DW21 Tractors with Athey PR21 Wagons loading up for another fast rock haul on U.S. 101 project. Conditions like this explain why Project Supt. Saul says he picked Caterpillar for its "ability to do the tough work."

Four CAT D9 Tractors are on the job here, along with five DBs, three No. 12 Motor Graders, three DW21s with Scrapers, three DW21s with Athey PR21 Wagons, and a D13000 Caterpillar Diesel Engine.

Athey PR21, teammate of DW21 Tractor, can haul 34 tons of rock or other material efficiently. On this job it hauls about 18 cu. yd., making 1-mile round trip in about 12 minutes—against a return grade of 12% in places.



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"This job is plenty tough. We called on Caterpillar-built equipment for this one. We get good service with very little down time—and then our Caterpillar Dealer goes all out to see that our machines are back at work as soon as possible."

Project Supt. Neal Saul's words should ring a bell for you, too. See *your* dealer for the machines that handle the tough jobs in stride. See him for replacement parts you can trust. See him for the fast, thorough service that keeps your machines making money.

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By taking over the major part of the work load, Rex Hydrocycle Control lets the operator perform at full efficiency the full 60 minutes of every hour, the full shift through. Hydrocycle Control is the nearest thing to assembly-line operation: operator merely sets the batchmeter for proper time. Then the full cycle is automatic. Operator is free to concentrate on spreading. All these advantages... and hand operation is still available when you need it.

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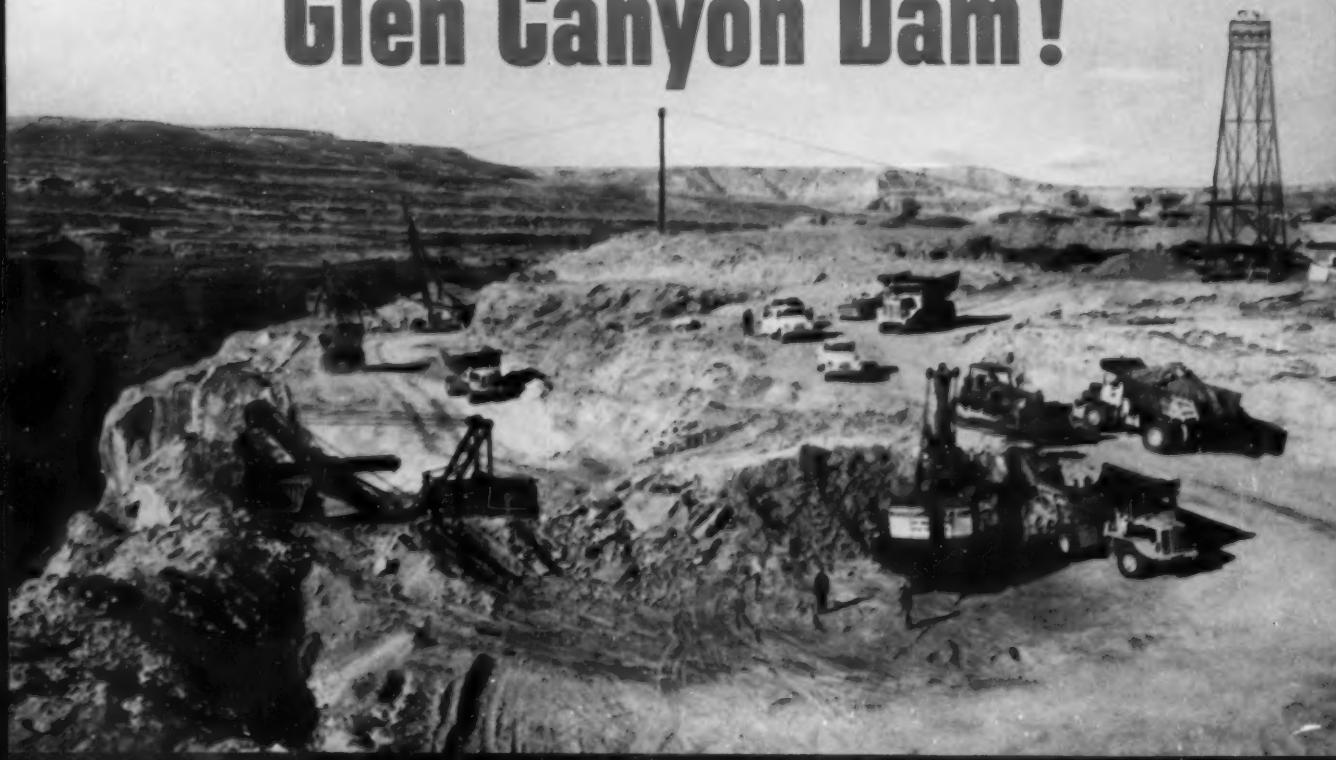
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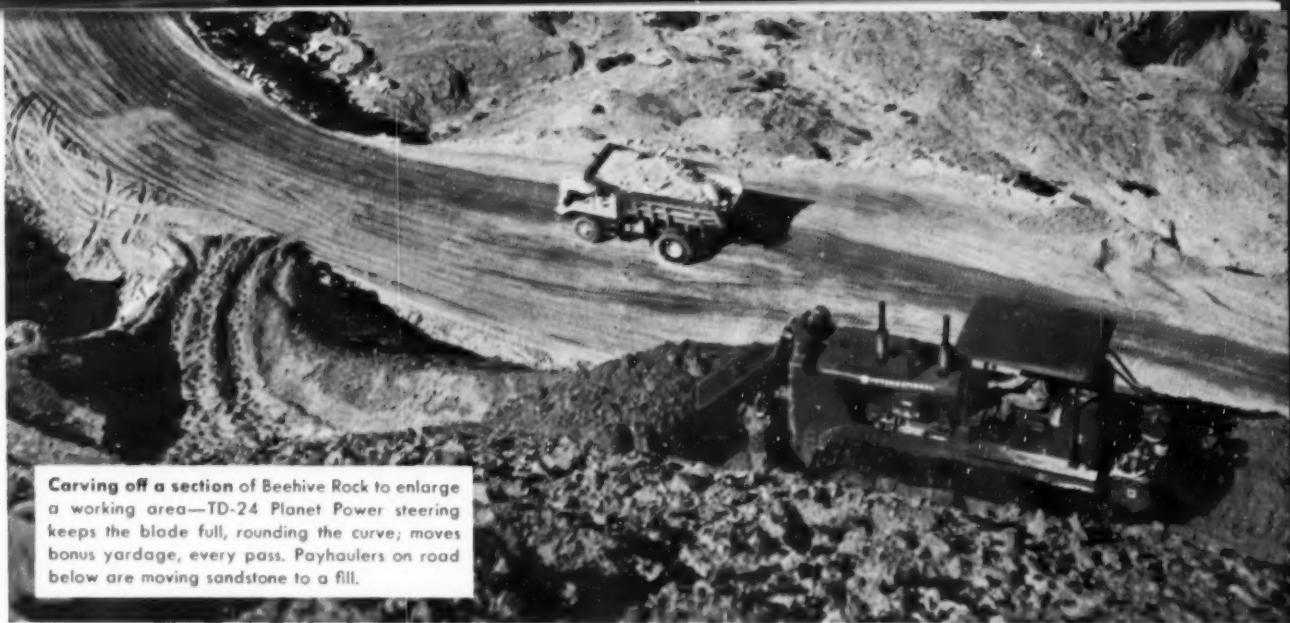


↑ Noon time is inspection time as Merritt maintenance men, using International welder and shop trucks, roll up to Marion power shovel for fast, on-the-job service.

\$108 million contract crawlers, haulers,

"95" Payhauled fleets keep busy on both sides of the 700-foot-deep canyon. These three units are hauling shovel-loaded rock from spillway excavation on the huge Glen Canyon Dam project.





rolls on schedule with International® trucks and service!

8-passenger International Travelall, with hill-climbing four-wheel-drive, transports engineers and surveying equipment over rough terrain right to the dam site.

Here a rugged International truck with boom rig is used by electrical linemen to set up important transmission lines on the east side of the Colorado River.



On-the-spot maintenance. International shop truck moves in as shovel takes "fuel break" from International cab-forward tanker.

Big capacity. Six-wheel heavy-duty International truck with 5,000-gallon tank sprinkles water for compaction of road base.



MERRITT-CHAPMAN & SCOTT CORPORATION is shooting to complete its \$108,000,000 Glen Canyon Dam contract—biggest competitively bid job ever awarded to a single contractor—well ahead of the specified seven-year limit. A big fleet of International equipment helps keep this huge Bureau of Reclamation project on the Colorado River in Northern Arizona rolling at record pace.

Planet Power-steered TD-24 crawlers prove the worth of full-time live power on both tracks—blading bonus loads 'round the curves. Grade-beating "95's" high-ball rock show why a load-and-road-matched Payhauled® fleet—bonus-powered with turbo-charged dieselengines—belong on this tough, high-altitude job. International trucks are here, there, and everywhere—handling a multitude of different material, equipment, and personnel-carrying assignments.

And complete International parts and service is minutes close to insure high performance availability of every International machine.

Making ready for power. Conventional International truck with engine-driven auger sinks holes for transmission lines.





Track-roller lubrication of the TD-24's only needs to be done each 500 working hours. A cab-forward International truck, provides an efficient, mobile "service station." This compact International was chosen for exceptional maneuverability.

Prompt, performance-backing International service ... company and distributor ... *keeps 'em rolling!*

The complete service resources for which International is world-famous are on the job for Merritt-Chapman & Scott—to help keep all International equipment rolling and producing!

It makes no difference that the job is remotely-located and 125 miles from the nearest rail-head. International, the distributor, and the dealer concerned have augmented existing parts stocks and facilities—have set up supply channels that assure on-the-spot parts availability.

Specialized distributor and company servicemen are so promptly available it's as convenient as a "down-the-street" service department.

YOU CAN HAVE THIS SAME big-capacity, specialized International performance—wherever you

operate and on whatever scale—and with top performance-backing company, distributor and dealer service. See your International dealer or distributor for a demonstration of the construction equipment and motor trucks you need for high-balling your next job!



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International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Ill.

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A quality rope is a safe rope

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For extra strength—buy Wickwire's Double Gray
IWRC extra improved plow steel wire rope

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LOOK FOR THE
YELLOW TRIANGLE

How millions of dollars can be saved annually on the Highway Program

A recent survey by *Engineering News-Record* shows that in many states progress payments to highway contractors, supposedly paid in from 2 to 23 days, are actually held for as high as 12 to 150 days. Retainages, claimed by highway departments to be paid in from 2 to 52 weeks, are actually held by some highway departments for as high as 8 to 130 weeks according to contractor reports.

"Private retainage" due to intentionally underestimating quantities on progress payments, or undervaluing partial completion of an operation, further aggravate the situation and further reduce the contractors' working capital.

All payment-delays minimize competitive bidding . . . require increases in bid prices to cover financing costs . . . penalize modernization of contractors' equipment . . . and limit hiring of adequate manpower. All of these delay completion and increase costs of the roadbuilding program.

Here are suggestions made by highway contractors to *Engineering News-Record* for remedying this slow-pay problem.

1. Set up arbitration boards to settle disputes promptly between the contractors and the states. Litigation, so costly to both state and contractor in time and money, can be avoided.
2. Make the bond premium a contract item payable by the state with the first estimate.
3. Increase field personnel to permit quick and accurate determination of quantities.

4. Give the resident engineer more authority — particularly in approving payments for obvious overruns as they occur.
5. Pay for contract material delivered to the job site but not yet incorporated in the work.
6. Require that states pay interest on any money withheld from the contractor longer than 60 days after due date. (Pennsylvania has just adopted a modification of this principle — it will pay interest on final payments not made within 90 days after job completion.)
7. Adopt more reasonable retainage practices.
8. Streamline the entire payment system and make it simpler.
9. Pay for completed structures independently of road work. Since structures are ordinarily finished first, this will free contractors' money for subsequent road work.
10. Bid more items on lump sum and save endless computations.

Reprints of the *ENR* "Highway Pay" report are available on request to *Engineering News-Record*, 330 West 42nd St., New York 36. Any comments and additional suggestions you may have for improving prompt and fair terms of payment on highway contract work will be appreciated. Address your letters to Merle Yontz, President . . .

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Tests on Filter Sands Show—

How to Install Subdrains

That Won't Clog

By J. M. Robertson

Supervising Engineer, Armeo Drainage & Metal Products, Inc.

Clogging can be prevented before trouble begins by specifying filter material of the right gradation, and by job supervision to see that the job is done right.

CONTROL OF GROUND water by proper subdrainage is not new. It has long been known that excess moisture in the form of ground water is detrimental to all types of earth construction. It not only reduces capacity of soils to support loads, but if the water freezes, can result in differential heaving. Embankments, pavements, runways and tracks are robbed of adequate support, and they fail prematurely or require excessive maintenance. Slopes become unstable and landslides plague the location.

The solution, of course, is simple. Choose the best soils available for the construction work. Be sure that the water is drained out and kept out.

Given the conditions where the presence of excessive ground water causes foundation instability, most engineers today will treat the cause

rather than the effect by designing an adequate subdrainage system. But far too often engineering supervision ends here. Little thought is given to the installation of the system—even though it will be effective only as long as the pipe remains free from clogging and has a properly designed infiltration area.

Much misinformation still exists regarding the installation of subdrains. One of the most serious lacks has to do with filter material. Early subdrains often consisted of a trench fill with brush or large rocks. French drains consisting of trenches filled with coarse rock were also widely used. It was thought that the use of coarse material with the accompanying large voids was beneficial for the free movement of the water that was to be removed.

However, later investigations revealed that the large voids quickly

filled with finer material and clogged, thus rendering the whole system inoperative. The first use of pipe under similar conditions gave the same results.

Filter sands for water treatment have been studied extensively for better than 50 years. Yet the results of these investigations have been little used outside the field of water treatment itself. There are some notable exceptions.

About 1920, Terzaghi successfully patented and used a reverse filter to control seepage under a dam on a pervious foundation. Such a filter comprised the use of layers of filter material, each layer coarser than that below.

● In 1940, G. E. Bertram of Harvard published a report of an experimental study of filter requirements directed toward the establishment of fundamental relationships. He found that stable conditions would prevail (that is, no fines would wash into the filter) when 15 per cent of the filter material was of a size not more than 8 to 10 times the size of 85 percent of the fine base material. Bertram used uniform sizes of material in his investigation to establish a limiting size ratio.

One of the most significant investigations in this field was carried out in 1941 by the U. S. Corps of Engineers at the Vicksburg Waterways Experiment Station. After receiving the assignment to build airports for the Army, the Corps set up tests to determine the filter requirements of underdrains.

From the results of these tests the Corps of Engineers established criteria for underdrain filter material that are still valid today. In brief, they found that the 15% size of the filter material must not exceed 5 times the 85% size of the adjacent soil material if this adjacent material is to be prevented

(Continued on page 98)



● An Armeo perforated pipe installation on the Kentucky Turnpike. Part of base drainage for the new express facility opened to traffic late in 1946.



• Showing travel paths of the tractor-drawn vibrator, which then made lapping passes.

Some Practical

By G. O. Garis

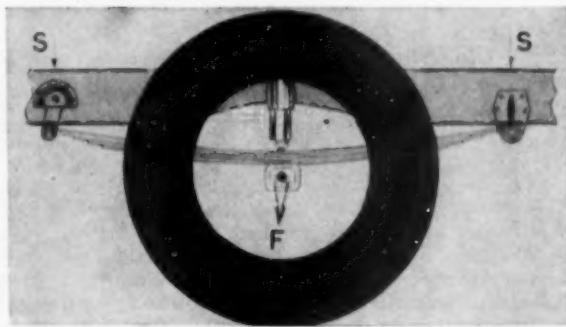
Manager of Research, BROS Incorporated

Both the contractor and the engineer will find this discussion of fundamentals of value in better understanding how to go about utilizing vibratory compaction. A conclusion of particular importance is that the dynamic force must be as large as possible (and therefore a relatively large static weight is desired) to produce the best compaction in the shortest time.

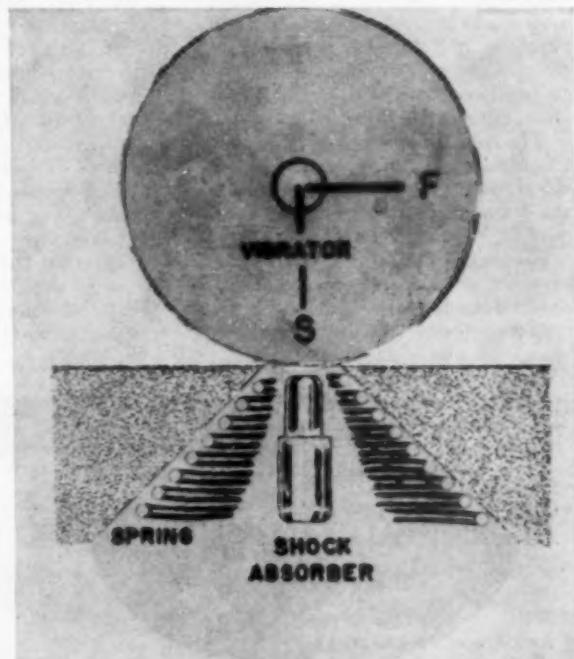
VIBRATORY COMPACTION of soils has increased rapidly in popularity in the last few years. Considerable research by Prof. Tschebotarioff of Princeton University and by the California Institute of Technology and others has yielded much valuable information on the subject. These research studies have pointed out the many variables involved in vibratory compaction and, in some measure, the relative importance of these variables. However, moving from research studies to practical, applied knowledge, directly and immediately useful to the contractor, is often a difficult task. It is the purpose of this article to give some of the practical aspects of vibratory compaction.

Soils generally may be divided into cohesionless (sands and gravel) and cohesive (clay and loams). Most work with vibratory compaction equipment has been on sand or sandy loams, although there is an increasing tendency toward its use on cohesive soils, sometimes indiscriminately. The value of vibration is clearly evident and understandable for cohesionless materials, but is far less understood for cohesive soils.

Sand is much like sugar in texture and behavior—we know from experience that by rapping or jarring a bowl of sugar, the sugar grains flow over and around each other to fill the voids; this settling continues until the voids are too small to be filled by the smallest particles present. Further vibration



• Figure 1A—A hydraulic shock absorber and spring system dissipates energy—affording analogy with vibrating compaction's action.



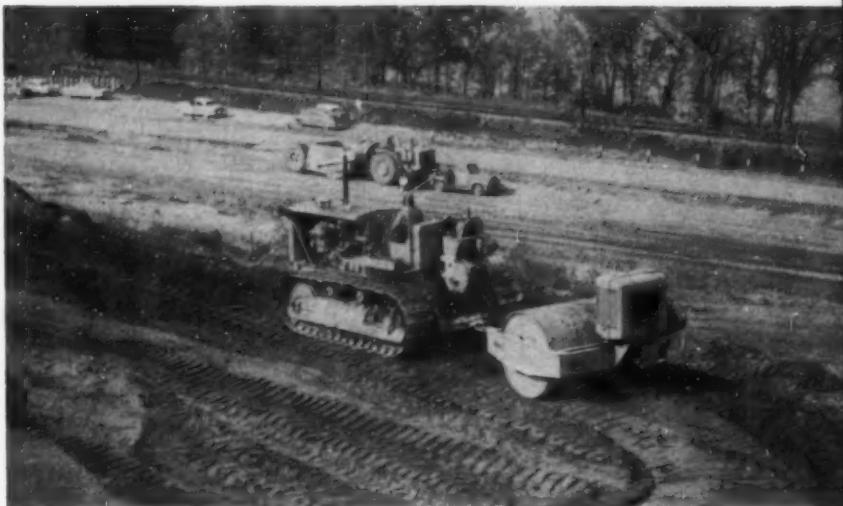
• Figure 1B—Earth being compacted offers a similar effect to that of a shock absorber, as discussed in Mr. Garis' article.

Aspects of Vibratory Compaction

Vibratory compaction in progress on a 1957 Minnesota relocation project, U.S. 61, near Winona. The prime contractor is Badger Contractors, joint venture of H. Turner & Son and Boswell, Van Vechten & Chapman, of Baraboo, Wisconsin.

A Bros Vibra-Pactor is shown compacting on an 11 ft. fill. Lifts were being put down in about 9 in. depths. Standard AASHO densities of 95 percent were specified for the sand-loam material except for the top 12 in. which required 98 percent.

Continuous rolling with sheepfoot units could produce only 90 to 93.2 percent of densities. Tests by the Minnesota state highway department showed the vibratory roller here was obtaining densities of 98 to 99 percent. Moisture content was on the lean side of the 13 percent optimum.



is of no appreciable value, and we have reached the maximum density practical. Further increase in density can only be accomplished by breaking up the particles into smaller ones which can now sift into the small voids. The major restraint to particle movement in this case is friction of one particle moving over another. The addition of some water reduces the particle friction, allowing easier and more complete movement of the grains. However, if moisture is increased above the optimum, the water must be displaced from the voids, resulting in less efficient and less complete compaction.

Cohesive soil particles are bound by many forces not yet clearly understood—electrical charges, intermolecular attraction, surface tension and other phenomena have been offered as explanations. But the end result is that such soils do not permit the particles to flow over and around each other freely. The forces bonding the particles must be broken by force. It is well known that moisture is extremely important. Soils with moisture less than the optimum do not compact as completely as those with optimum moisture, and above the optimum the soils approach a plastic stage and begin to act as liquids—distributing an applied force equally in all directions, and, therefore, not moving particles into the voids.

It is, therefore, clear that vibratory compaction on loose sand or gravel using average light-weight vibrating compactors is more effective than using the same light-weight vibrator on cohesive soils. Since the bonding forces in cohesive soils are strong

and must be broken by force, it requires a heavy vibrator with high dynamic forces to do a job.

Many new terms, not common to the usual compaction methods, have been introduced with vibrating compaction. These terms include static weight, dynamic force, resonance, soil mass, etc.

To assist in understanding these terms, we will define each term and attempt to illustrate its significance:

● **Static Weight**—This is the total weight of the vibrator assembly.

● **Dynamic Force**—This is the force which produces the vibration, and which may be created by revolving weights, hydraulic reaction or other means.

● **Resonance**—When a vibrator is operated through a range of frequencies (vibrations per minute); with a constant dynamic force, there will be one frequency at which the soil and vibrator

TABLE I
Typical Soil Resonance Figures

TYPE OF SOIL	APPROX. RANGE OF RESONANCE VIBRATION, 1 MINUTE
MEDIUM SAND	1100 - 1450
COARSE SAND	1150 - 1500
GRAVELLY SAND	1000 - 1250
MOIST CLAY	1150 - 1600

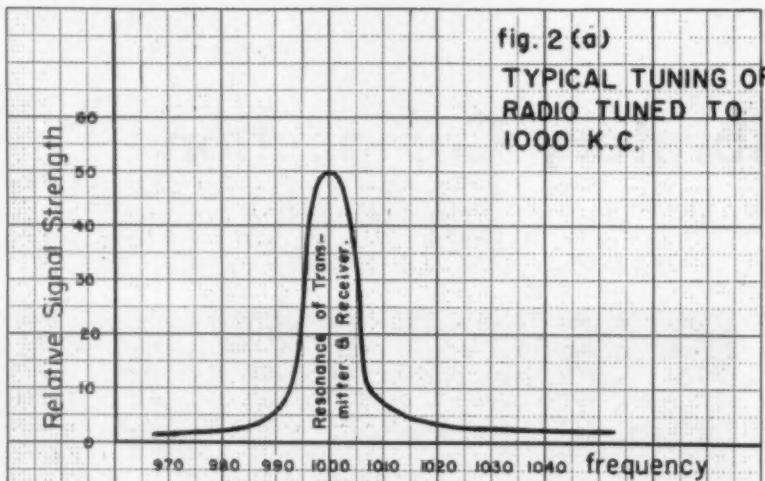


fig. 2 (a)
TYPICAL TUNING OF
RADIO TUNED TO
1000 K.C.

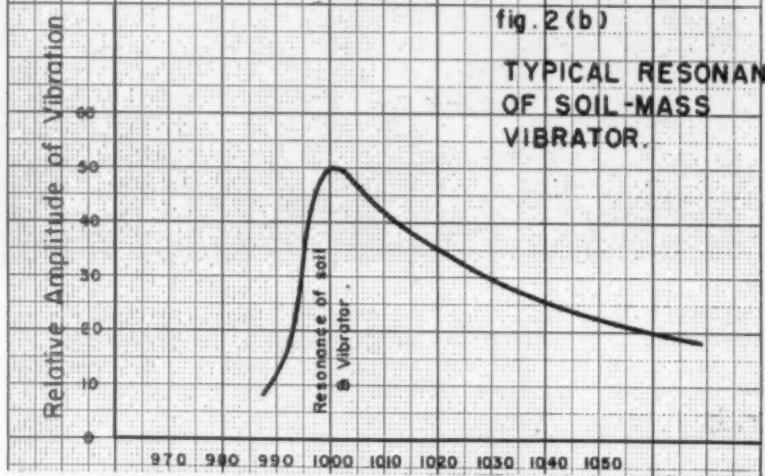
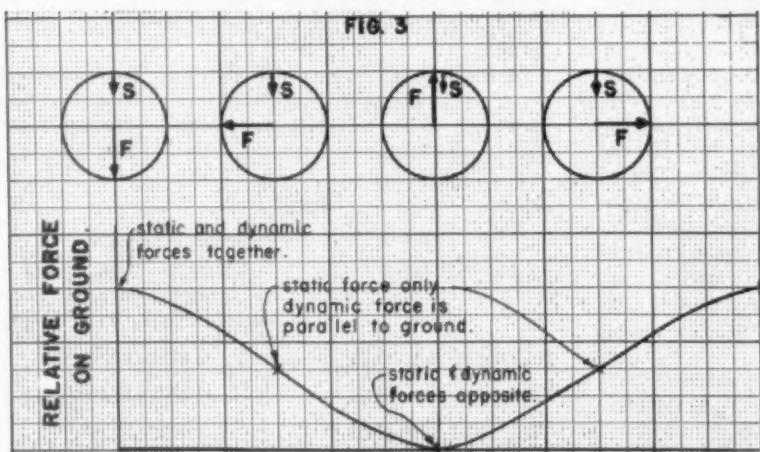


fig. 2 (b)
TYPICAL RESONANCE CURVE
OF SOIL-MASS
VIBRATOR.

- Figures 2A and 2B—showing analogy of radio tuning to the “tuning” of a vibrator to resonance of a typical soil-mass vibrator.



- Figure 3—Force pattern during one revolution of vibrating mechanism.

will vibrate much more strongly than at any other frequency. This is analogous to tuning a radio—no signal is heard from a particular station until the set is in tune with the transmitting station. This condition is known as “resonance.”

- **Soil Mass**—The quantity of earth that is being appreciably vibrated at any given instant.

If we consider an automobile with springs but no shock absorbers, we know that the car will bounce severely on rough roads, and at some speeds will go into violent bouncing. This is due to the resonant frequency of the spring-car system. Now if we add shock absorbers, the bouncing is sharply reduced but the resonant frequency is relatively unchanged. The shock absorbers have absorbed the vibration energy and have dissipated it in heat.

Likewise, the earth-vibrator system has a resonant frequency, and the inherent friction of the particles moving over each other is the shock absorber or dampener (Fig. 1). In an automobile, the weight of passenger (or ballast) changes the bounce and resonance frequency; so does a change in the soil consistency or the vibrator weight change the soil resonance.

We have seen that in tuning a radio station, strength increases sharply when we are at resonance. In the soil-vibration system, similar strong vibration resonance is reached (Fig. 2). But unlike a radio in which the transmitter frequency is accurately maintained to 1 cycle in 1,000,000 and the receiver (earth) is held to similar close limits, the vibrator (usually engine driven) has a speed variation of at least plus or minus 5%; and the earth, because it is not homogeneous or uniform, can vary in resonance by over 100 percent (Table I).

It is clear, therefore, that operation at resonance can produce large forces with relatively small signals, but to maintain the vibrator-soil at resonance at all times is practically impossible. Such a system would require elaborate means to detect resonance to constantly readjust the engine speed to it.

As illustrated in Figure 2, the typical soil resonance curve is steep, and resonant effects are appreciable over only a very small band (again just as in tuning a radio). Thus, any attempt to gain the amplification effects of resonance requires extreme accuracy of measurement

(Continued on page 86)

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AND USED EQUIPMENT**

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VIBRATORY COMPACTION

(Continued from page 84)

and control, impractical for present day contractors' equipment.

Fortunately, if the soil is forced to vibrate at some frequency other than its resonant one, it will still compact because the particles are now forced to shake into the voids. Obviously then, the higher the dynamic force the more particles will move and the more effective is the compaction.

In Figure 3, we have shown a simple vibrator with a certain static weight S and a dynamic force F . Vibration is usually caused by having the force F revolve—so when it is vertically down it adds to the static weight, and when it is vertically upward it subtracts from the static weight. Thus the force imposed on the earth varies from $S + F$ to $S - F$. If the dynamic force is made equal to the static weight, the force on the soil drops to zero when the force F is upward. If the force F is made larger than S , it will actually lift the vibrator off the ground when it is upward, and will cause the vibrator to drop with an impact or hammer-like blow. This latter effect does two important things:

1. It increases the downward compaction vibratory force on the soil.
2. It causes a hammer or impact blow to further compact the soil.

Tests have shown that, neglecting resonant frequency, it makes little difference what number vibrations per minute are used. The important thing is the magnitude of the force and the *total* number of vibrations for a given area. Experience has shown that frequencies in the range of 1000-1300 vpm. are most practical both from performance and design standpoints.

Most of the effect of vibration occurs in the first 5 to 10 seconds; further vibration has a relatively small effect. Satisfactory compaction cannot be obtained by merely vibrating rapidly with a small force, as these small forces are damped out and do not penetrate. Satisfactory vibratory compaction requires large dynamic force for deep, effective penetration and results.

For example, a vibrating roller operating at 1200 vpm. and towed at 3 mph gives a compaction force approximately every $2\frac{1}{2}$ in. of forward motion, or so closely spaced that the effects of many successive vibrations overlap.

From analogy of the vibrator-soil

system to other vibrating systems, it appears logical to assume that the tighter the "coupling" to the soil, the greater will be the vibrator's effect. Since this "coupling" is primarily a function of the static weight and the area in contact with the soil, it is evident that the heavier vibrators are more effective than light ones.

Final Conclusions

To summarize, the following conclusions are offered:

1. Cohesionless soils are more easily and completely compacted than are cohesive soils.
2. Moisture plays an important function in compaction by vibrations; moisture at or slightly above the optimum appears to give best results.
3. Resonance of soil-vibrator is an ideal situation, but extremely difficult to attain and maintain in practice.
4. Dynamic forces should be as large as possible to produce the best compaction in the shortest time.
5. Static weight is important, as it increases the effectiveness of the dynamic forces.

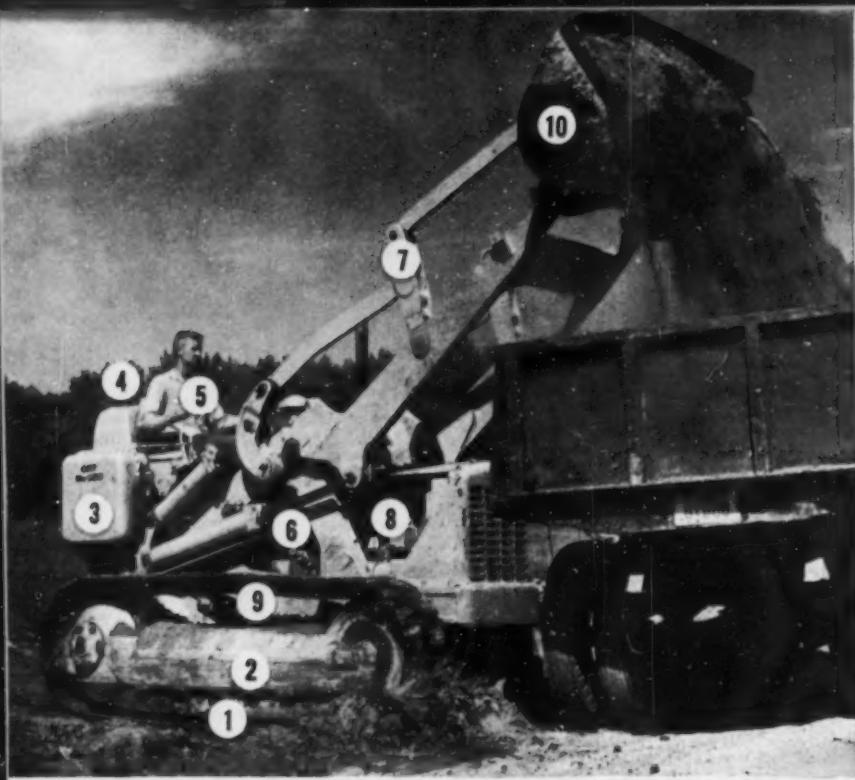
6. Lower vibration per minute with large dynamic forces are much more effective than higher frequencies with small dynamic forces.

It is evident that vibratory compaction is here to stay. It enables some jobs to be completed more rapidly and at a lower cost than by any other method. It is not, however, an answer to all compaction problems and should not be used indiscriminately for heavy clay soils. As more experience is gained with vibrators, soil additives or conditioners, it is logical to believe that the properly designed vibrators will find ever widening fields of application.

Winter Storms Dip Heavily Into Maryland Funds

The three snowstorms of December 4, December 11, and January 7 of the past Winter cost the Maryland State Road Commission \$343,000 in direct maintenance expenditures for snow removal and related work.

According to the Commission, 83,805 man-hours and 52,000 equipment-hours were required for these three storms, which figures did not include the worst storm of all, occurring in February, and paralyzing traffic over many miles of road.



Caterpillar No. 955 Traxcavator works 10 hr. a day loading sandy loam into 6-yd. trucks for Brookings Excavating Co., Brookings, S. D. Two blocks of a street on the outskirts of town are being widened. Traxcavator is leveling bank. "One of the features we like best about it," says owner Lyle Stewart, "is the 40-degree tilt-back. It's especially useful tearing up old roads and sidewalks. You can get the bucket under a slab and use the tilt-back to tear up larger slabs at a time." This No. 955 is used for backfilling, too, and for digging basements, as well as for finish grading.



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How Euclid Teaches Mechanics and Service Men

Dealers' and contractors' men, fresh from the Illinois Toll Road season, were put through "college" by a mobile training unit, during a 2-week stand near Chicago.

CONTRACTORS holding work on the Northern Illinois Toll Road trundled 325 pieces of Euclid equipment into the work sites during the summer of 1957. This invasion swamped the repair and maintenance facilities of Gil Boers Equipment Company, the only Euc dealer in the area.

Through the feverish labors of his own staff, plus the aid of the Euclid district service representative and an emergency staff of mechanics sent from the plant in Cleveland, Boers was able to keep his nose above water.

This year, while yet applying liniment and catching up on sleep, Boers decided to apply some preventive medicine. He sponsored a service training course January 6-18 conducted by the Euclid Division of General Motors Corporation at the GM training center in Hinsdale, just west of Chicago. (A three-day session on Detroit Diesel engines was included in the program.)

The course was conducted by three Euclid service training instructors who are part of a staff which operates out of Cleveland as a mobile training unit. Over 50,000 lb. of parts, assemblies and in-

structional materials are continually on the move in a semi-trailer from coast to coast as the company fills requests from dealers and contractors for the training course. The course itself is presented with the compliments of the company; the local sponsoring firm is asked to pick up the tab for meals.

The 33 attending this session were dealer shop people and contractor personnel involved in the toll road work. Also included were representatives of aggregate firms, a home builder and a railroad. It was the first time for most in a factory training course.

The "school day" was 8 a.m. to 5 p.m. with an hour for lunch. The class was divided into two groups, each of which was taken through the entire program in the Monday-to-Friday period. Class time was given half to actual tear-down and re-build instruction, half to lectures and slide presentations by the instructor.

Euclid's theory is to use the smaller groups in order to accentuate informality and bring out questions. Name tags carry first names, and the instructor brings his group along on each step. With the group



● Euclid instructors at the Illinois Toll Road school. Left to right: Jim Fletcher, Phil Neppel, supervisor of service training, Eric Hutchison, John Lyons.

hanging over an open housing, for example, while taking apart a transmission, the instructor points down and asks "can anybody tell why that flange is built the way it is?"

In a slide session, the instructor points to a picture of a gear-type pump and asks "which is the intake and which the discharge side?" and requests reasons for the answers given. In a similar discussion at the Hinsdale meeting, lively discussion was aroused when the instructor showed a slide of a pump situated on a level above the oil supply and asked how the oil was brought up to the pump.

"This course stresses ordinary daily maintenance procedures," says J. P. Neppel, Euclid director of service training. "But we believe that thorough grounding in fundamentals is necessary for proper maintenance. That is why we emphasize the 'why' as well as the 'what'."

"This school is concerned primarily with the mechanical aspects of the equipment—the basic components from the engine back through the hydraulic system to the transmission. Our goal is to help the dealer to help the contractor take care of his own maintenance problems."

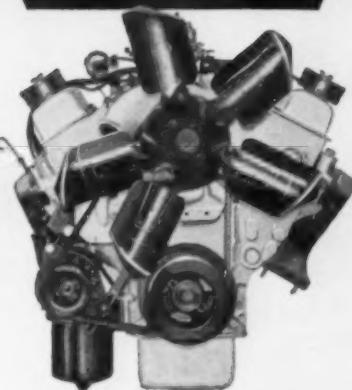
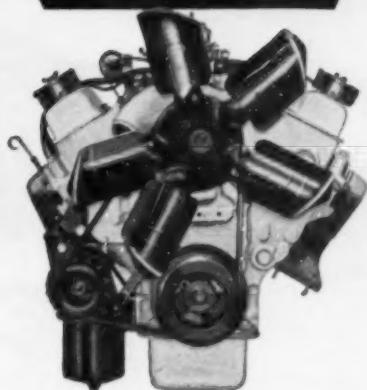
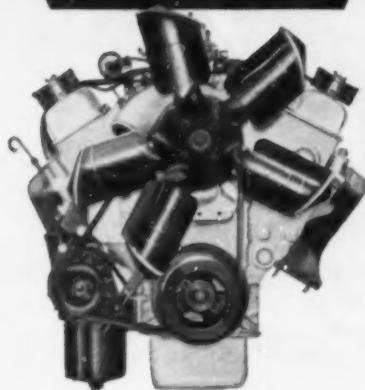
In this particular case last summer, Neppel said, the on-rush of work on the Illinois Toll Road required contractors to hire added personnel, many of whom were unfamiliar with the equipment. With a similar situation in prospect for the 1958 season, dealer and manufacturer here have joined forces in advance to bring about more preparedness, with greater efficiency and less down-time to follow.

● Instructor Jim Fletcher points out a detail during the tear-down of a torquematic transmission.

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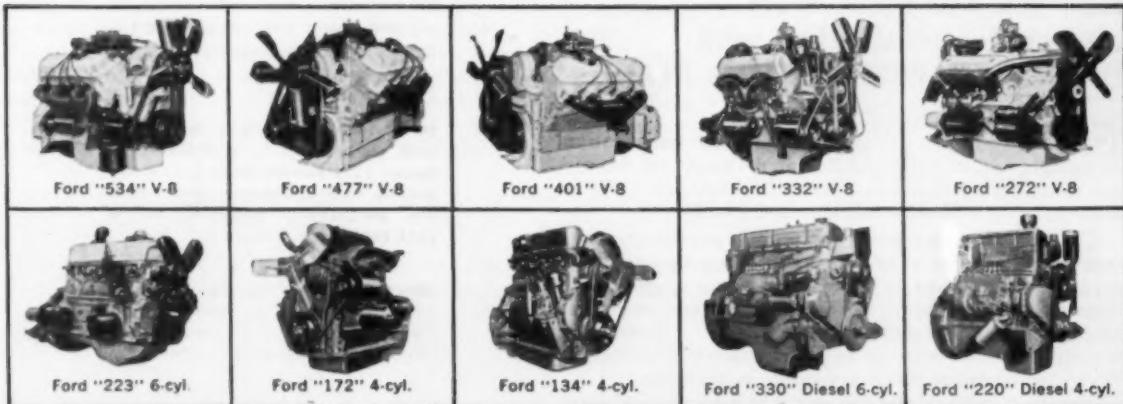
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Perhaps one Cedarapids unit will do your job . . . maybe you need three, or five, if your capacity requirements run into the thousands of tons per hour, your pit conditions are difficult to crack, or the specifications you have to meet are unusually exacting.

With the big contracts coming up for the Highway Program, we urge you to get the facts about what a Cedarapids Unitized Plant can do for you. Talk to the many big-time operators who use them, then see your Cedarapids Dealer for specific details.

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You're looking at a typical example of a Cedarapids Unitized Plant. The photo above shows one of the five different combinations of five Cedarapids units used by one contractor to handle material in three different pits and meet a wide variety of specifications. The five set-ups used on the job are detailed below.

SET-UP 1—As shown above, five Unitized Units were used . . . a Ground-Level Feeder, 2236 Portable Primary, Twin Jaw Scalping Plant, Commander Tandem Plant with pre-screening attachment, and a 4024 Roll Crusher Secondary.

SET-UP 2—Three of the same units used in the first set-up . . . Feeder, Scalper, and Roll Secondary . . . produced 220 tons per hour of minus $\frac{3}{8}$ " material.

SET-UP 3—The Commander Plant with pre-screening attachment, was used alone to produce 170 tons per hour of minus $\frac{3}{8}$ ".

SET-UP 4—Operating independently in the same pit as Set-up 2, the Commander and Twin Jaw Scalper with the Roll Secondary Plant averaged 3000 tons of $\frac{3}{8}$ " material in a 9-hour period, which included waiting time for trucks.

SET-UP 5—The Portable Primary and Commander Plant with pre-screening attachment were combined.

Cedarapids

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Broken Tractor Drive Housing

Repaired at One-Sixth Cost

PERSEVERANCE and initiative in the shop recently solved a \$1,600 problem for \$335 for a west coast machinery firm.

A crawler tractor with a cracked final drive housing was handed over to Shepherd Machinery Co. in Los Angeles for repairs and reconditioning. It was learned that cost for the replacement would be \$1,600, not including freight charges. This, plus unsatisfactory experiences with brazing and arc welding, spurred Shepherd's hunt for something new in the repairing of broken iron castings.

They called in another Los Angeles firm, Pakco Welding Supply Co., for consultation, and the following welding procedure was adopted:

The electrode selected was one designed to weld on cast iron at extremely low amperage. It could be used on either AC or DC current and could be obtained in all standard core sizes. Several of its characteristics made it particularly applicable for this job: it was fully machinable, practically free of

spatter, and its $\frac{3}{32}$ in. core size could be applied with 40 amps.

Due to the extent of the breaks to be repaired it was important that the least possible amount of heat be poured into the casting so as to minimize the chances of distortion.

A pneumatic chipper was used to vee the cracks. Standard practices of lineup and clamping were followed. Surfaces to be welded were cleaned of all sand, dirt, oil and grease. The latter were removed by heating with air-acetylene flame to 700 F.

Maximum penetration was desired along with low amperage. Hence DC reverse polarity was decided upon. Welds were peened between passes. Flux residue was removed with a wire brush.

Five pounds of the electrode completed the job. Other cost items in the job included partial disassembly, preparation of the cracks, lineup and clamping, welding, peening, machining, painting, reassembly, use of welding machine, fuel and consumed supplies —totalling \$335.

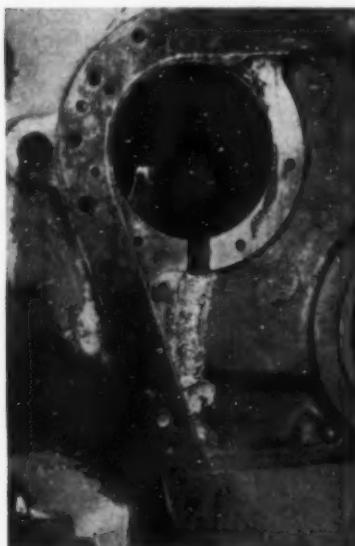
3 Welding under way on left side of final drive housing. Low amperage nickel-core electrode permitted welding in place without preheating.



1 Cracks on right side of broken final drive housing have been vee-ed and flame-cleaned of oil and grease. One welding pass has been made.



2 Right side cracks in final drive housing have been welded in place, with welding now ready for final finish.



4 Weld on left side of broken housing has been completed.

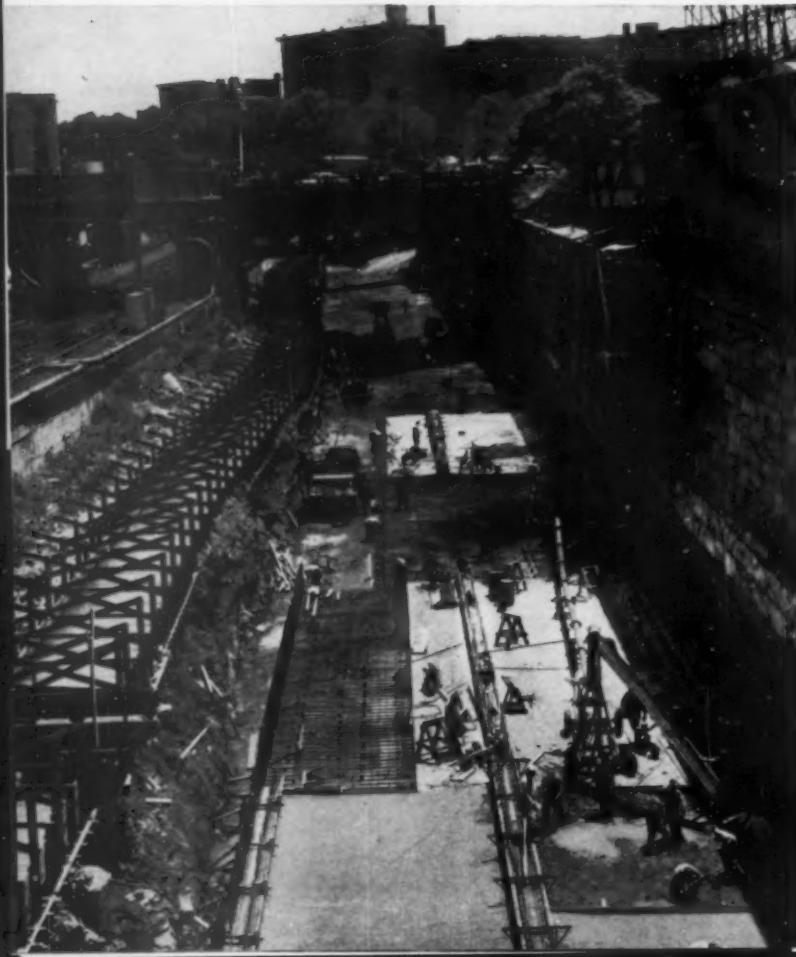




● Clearing excavated channel of debris with Northwest 80D pull-shovel, dozer and truck, while water flows unimpeded. Flume was built later upstream and water dammed along foot of (right) wall to permit construction of conduit invert along channel floor. (Photo by Baltimore Sun.)

A bold and imaginative roadway design resulted in a project here which involved a special hazard; flash floods. The worst happened. Here's how the contractor's crew worked to make the best of it.

Expressway Contractor Battles



By William F. Hallstead

Whitman, Requardt & Associates,
Consulting Engineers

BALTIMORE'S JONES FALLS EXPRESSWAY, when it is completed within the next 5 years, will carry heavy traffic between the heart of the city and its northern suburbs. This \$70 million highway, 10 miles in length, terminates in what has become one of the most unusual road-building jobs this city has yet seen. Roughly paralleling Jones Falls Creek for most of its length, the expressway is forced to travel directly above the watercourse between Howard Street and Guilford Ave., a distance of almost half a mile. In this stretch, contractor Charles W. Williams is building a 47' x 18' 2- and 3-celled conduit which will ultimately serve as a roadbed for the expressway.

What makes this construction job tough is that Williams is working in a 30-ft. deep channel hemmed in on the north side by a Penn-

● View east from Maryland Avenue bridge shows invert paving operations. Charles Street is seen in the background; Post Office annex at far left. (Summer, 1957.)

sylvania RR yard and a concrete retaining wall, and on the south by a high granite block retaining wall. The watercourse drains a metropolitan and suburban area of 55.5 square miles. A rainfall of any appreciable severity causes a sudden and dramatic rise in the channel water level—and the low-water level is where Williams has his men and equipment.

The conduit is designed to connect with an existing storm water tunnel built in 1912 for the Baltimore Sewerage Commission. Designed by Whitman, Requardt and Associates for the city of Baltimore, the new conduit will handle a flow up to 18,000 cfs—roughly equivalent to a 100-year storm. The 2,353-ft. long structure is composed of 492 ft. of 3-celled conduit between Howard Street and Maryland Avenue (1 cell 17'4" x 18' inside dimensions; the other 2 cells 15' 10" x 18' inside dimensions); a 70-ft. transition section; 1,708 ft. of 2-celled conduit between Maryland



• Shovel and truck team clears area beneath Maryland Avenue bridge after July, 1957, storm. Wood flume begins at left.

Floods to Build "Conduit Roadbed"

and Guilford Avenues (both cells 23' 6" x 18' inside dimensions); and an 83-ft. transition to the existing tunnel. The 3 cells to 2 cells design was required because of depth limitations along the upper part of the job. The work crosses beneath Maryland Avenue, Charles St., St. Paul St., and Calvert St. The existing bridges on these heavily used streets are being replaced one at a time to avoid tie-ups.

Contractor Williams' conduit job began in October, 1956, with the problem of getting heavy equipment into the existing channel. What had promised to be the obvious point of entry—a fairly level area upstream of Sta. 23—proved deceptive. Williams could get his equipment in here, but a few hundred feet downstream the Maryland Avenue bridge was so low that not even a small dozer could squeeze beneath it. Williams had foreseen this situation in his bid, and obtained permission to go through a portion of a neighboring park. He excavated 30,000 cu. yd., stockpiled it in the adjacent park area, and attacked the retaining wall at Sta. 7 + 50 where soundings had indicated solid rock in the streambed.

Working at the bottom of the

steep serpentine access road in the excavated park, the contractor removed 800 tons of 6' x 3' x 1½' interlocked granite blocks. That phase of the work took two weeks, and it took a lot of equipment: a Northwest 80D shovel, a dragline and a clamshell crane, a 3,000-lb. "headache" ball, and finally dynamite. Before the wall was breached, water bubbled in behind it, and the contractor was required to muck out the lower end of his access road with a dragline, install underdrain, and backfill.

Once through the wall, Williams began the job of lowering the existing streambed 10 to 20 ft. to provide clearance for the conduit and the future highway. From the breach in the wall eastward, about 700 ft. to the mouth of the existing tunnel, an unusual rock formation formed the creek bed. Upstream from the breach at Sta. 7 + 50, the bed was composed more of overburden, muck and a powdery type of rock that turned to mud when saturated. Allis-Chalmers HD-6G and HD-5G loaders were put to work building a haul road above the level of the continuously flowing water along the south side of

the watercourse from the breach to the existing tunnel. A second haul road was built along the north side of the watercourse upstream from the breach to the end of the work near Sta. 24. When the roads were completed, the big equipment moved in.

In all, Williams used 4 Northwest cranes, a Northwest 80D shovel, two Northwest 1½-yd. backhoes, Allis-Chalmers HD-16 and HD-11 dozers, the two Allis-Chalmers loaders, and a Cat D6 to clear the overburden, muck and rock from the channel. Excavation began in late October of 1956, at the spillway in the mouth of the existing tunnel. This concrete entrance apron had a fall of 12 ft. in its 83-ft. length and it was drilled and shot while water continuously ran down its face.

When the spillway was demolished, work on the 700-ft. section of rock bed moved upstream in steps. From the center of the channel, a section 50 ft. long was drilled 8 ft. deep to within 5 ft. of the channel wall, then shot. Because of the oddly wedged rock formation, only a 4 to 5 ft. depth of excavation was realized on each pass. When a 50-ft. strip was cleared from centerstream to one side, then



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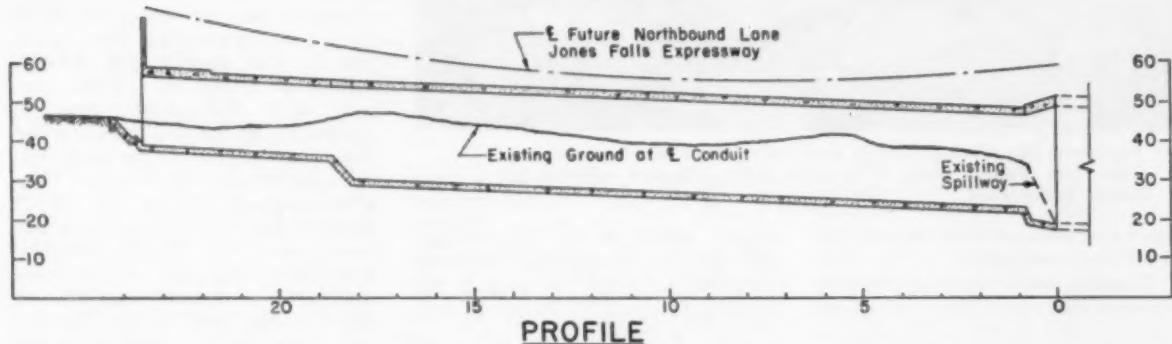
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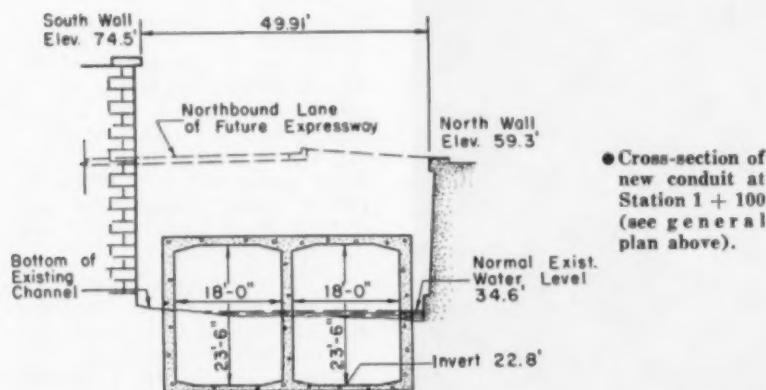
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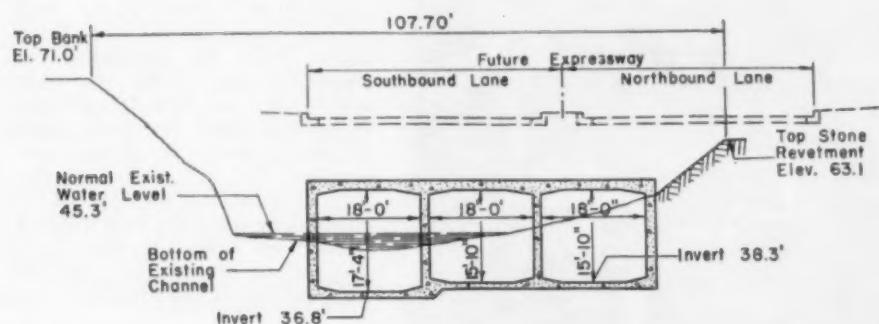
LOCATION PLAN



- General scheme of project showing how the streambed—and the concrete enclosure on which the expressway was located—thread through Baltimore's street system.



• Cross-section of new conduit at Station 1 + 100 (see general plan above).



drilling began on the opposite and parallel 50-ft. length. This process was continued upstream to the wall breach, and by working in such "steps" the contractor was able to lower the water level gradually and safely.

The channel was cleared and lowered some 20 ft. from Sta. 0 to Sta. 7 + 50 in five complete drilling, blasting, and excavating passes. The remaining 5 ft. of channel bed on each side, by now a rough rock wall, was then peeled down.

The total excavation within the pay limits was 58,000 cu. yd., and Williams estimates $\frac{1}{4}$ of this to have been rock-rock so hard that the bits on his two Chicago Pneumatic drills with 4-in. drifters averaged less than 50 ft. each. Some stone was so punishing that a bit would average less than 10 or 12 ft. The drills were mounted

- Section of conduit at Station 21 + 00 (again see above plan).



• Northwest 80D placing blasting mats near Maryland Avenue bridge. Temporary wooden flume is seen at right; entrance spillway in middle background.

on a Cat D8 and were supplied by a 600 cfm compressor.

Blasting was done by a two-man team—a city representative and an

- Concreting the invert slab. Exposed face below foot of existing granite block wall shows the depth that channel was lowered here.

expert employed by the contractor—and was accomplished without incident although the area is extremely confined by buildings and

railroad tracks, and spectators hovered overhead on the bridges that remained open. The maximum charge permitted was 9 lb. of dynamite per hole, and 6 holes with 9 lb. per hole were the most shot at one time. The normal blast was 4 holes. All blasts were controlled by three 12' x 12' one-ton blasting mats made of $\frac{5}{8}$ -in. cable and placed by a $\frac{3}{4}$ -yd. Northwest backhoe.

Weather Problems

To say that Williams worries about the weather is a complete understatement. Rain hasn't merely shut down his work—it is a real threat to his men and equipment. Just how treacherous Jones Falls can be was dramatically demonstrated on September 4, 1956. Five men were drilling the concrete spillway near Sta. 0 + 10 when the downpour began. As the water level began to rise, the foreman blew a warning whistle and ordered all his men and equipment out of the entire work area. But this was the first alarm and some of the men attempted to stay at work despite the warning. Within 15 minutes, the normal 4 in. depth of water flowing over the spillway was a roaring 6 ft.

As the water rose and increased its velocity, a crane near the wall breach led the parade of escaping equipment. Next out was an HD-5G loader, its treads still visible. The Allis-Chalmers HD-11 headed downstream toward the trapped drilling crew, but was forced to turn and abandon what had become a futile rescue attempt. When the HD-11 passed through the wall, rushing storm water foamed over the top of its treads.

As increasing water began to cascade over them, the drilling crewmen had secured their wagon drill to a ring bolt and fought their way upstream 125 ft. to a boulder lodged at the foot of the big retaining wall. This rock was normally 3 ft. out of water; now the men standing on it were in the swift current up to their knees. Frank Hoen, Williams' superintendent, lowered a rope to the crew. The Baltimore City Fire Department, summoned when the crew's plight became apparent, let down a ladder, but the men elected to take their chances with the rope. They clung there until the rain stopped. In half an hour, the water level dropped to near-normal, and the men walked out uninjured.



Traffic Engineers and Contractor Crew Cooperate to Restore Bridge

Capping the climax of woes related in this report, was what happened on September 10, 1957, when a flash flood hit Baltimore. It carried away 1,500 ft. of the wood flume here described, as water rose to 16 ft. in a few minutes.

Surface water from the adjacent rail yard tore out sections of the old granite-block channel wall, taking 80 ft. of new conduit wall with it.

This in turn undermined a corner of the Charles Street Bridge (see plan sketch), and a 15' x 30' section of pavement, sidewalk and railing fell in. This blocked one of Baltimore's most strategic rush-hour streets (40,000 daily traffic). At 4:15 p.m., acting swiftly, Traffic Commissioner Henry Barnes instituted a detour system which reduced delays.

The contractors' men also showed nimble-footedness. Clearing began at once in the channel, during which a crane had to be rescued. Many tons of granite was removed, a tangle of scaffolding and forms cleared, and the bridge and street repaired.

With draglines, the stream was cleared of overburden and muck from Sta. 7 + 50 to the upstream limit of work. In February, 1957, the streambed was dewatered. The contractor built a 10' x 3' wooden flume along the north side of the channel from Sta. 19 to Sta. 7 + 05. Made of 2 x 8 tongue and groove timbers, the flume was laid on 3 x 4 sleepers and 2 x 8 studs, requiring 48,000 board-feet of lumber. It descended on a 0.45 percent slope, and was designed to carry twice normal stream flow. A sandbag and earth dam at Sta. 19 guided the stream flow into the flume early in the dewatering operation. Later, water was channeled down the north side of the work area from Sta. 7 + 05 to Sta. 0 + 00 by means of a wooden panel dam supported on driven pipes and backed with sandbags, rocks and earth. This channel, about 15 ft. wide, emptied into the existing tunnel at Sta. 0 + 00.

Excavation (completed in early May) extended in places well below subgrade, to eliminate the possibility of trapping undrainable earth pockets between the underlying rock stratum and the conduit invert. With the flume operating efficiently, Williams gambled on excavating the trench for Class B backfill concrete to the full width of the channel. Well on schedule, he ran out of luck within two days of completion of the Class B concrete pour. A heavy storm sent water crashing through the sandbag dam, and the operation was flooded and set back two weeks.

On six consecutive weekends the temporary dam washed away. Storm

of the total 22,900 cu. yd. Class A concrete was poured for the invert. In July, erection of the Universal metal wall forms got under way. The entire structure is slated for completion in February of 1958. It will be covered with earth which will serve as the roadbed for the future Jones Falls Expressway main line.

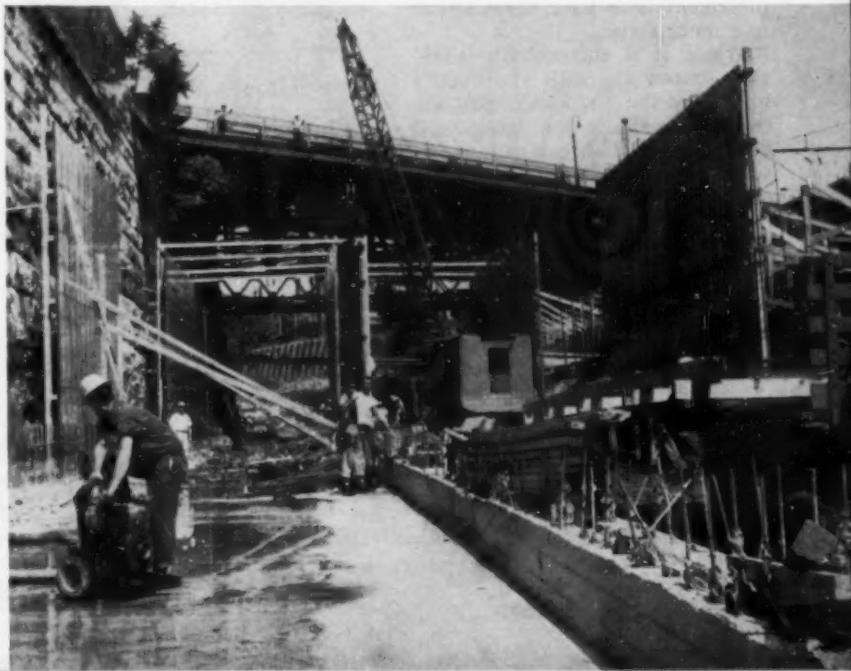
Contractor for the \$2,300,000 conduit is Charles W. Williams & Associates, Inc., Baltimore. Design and supervision of construction are by Whitman, Requardt and Associates, Baltimore, under the direction of the Bureau of Highways, Department of Public Works of Baltimore City.

ASCE Announces Expanded Exhibit, October, 1958

Plans for the second Civil Engineering Show, to be held in conjunction with the 1958 Annual Convention of the American Society of Civil Engineers at the Hotel Statler in New York, October 13-17, have been announced by Executive Secretary W. H. Wisely.

The complete success of the Society's first commercial exhibit in October, 1957 has prompted expansion of facilities to provide larger booths and double the number available in 1957. Exhibiting firms will again be limited to those supplying materials, equipment or services used or specified by civil engineers.

● Form-setting operations under way for 2-celled section east of Maryland Avenue bridge, seen in background.





● Traverse drain being installed on U. S. 66 in Missouri. Effectiveness of such drains depends on the gradation of the filter material. Here a concrete sand was used.

INSTALLING SUBDRAINS

(Continued from page 81)

from passing through the filter and clogging the drain. The 15% size of the filter material, however, need not be less than 0.1 millimeter if the soil is cohesive.

To obtain a satisfactory permeability ratio, the Corps recommended that the 15% size of the filter material should be greater than 5 times the 15% size of the soil. Also, to prevent segregation of the filter material during placement, its uniformity coefficient, the ratio of the 60% grain size to the 10% grain size, should not be greater than 20. One of the best ways to prevent segregation during placement is to have the material in a moist state.

While it is theoretically advisable to test the soils and specify filters for the particular soils encountered along the proposed drain, to a certain extent it is impractical and will not usually be done. Therefore, if possible, it is more practical to select a filter gradation that will perform satisfactorily for all soils or nearly all soils. If necessary, the specification can be varied for certain districts or even for certain types of soils. The limiting gradation shown in "Filter Limitations" is believed to be satisfactory for nearly all soils. The coarse size limits of the 15% size are identical with that of concrete sand as specified by the AASHO.

Since it is necessary to use a sand

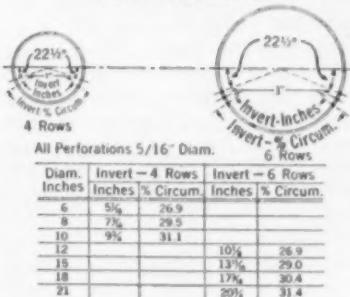
or a sand-gravel filter material, it is obvious that special attention must be paid to the infiltration area in the pipe (openings for water intake.)

● The second part of the Vicksburg experiments consisted of testing 30-ft. lengths of 6-in. pipe in a wood flume. One of the objectives of these tests was to determine the amount of filter material that would wash into the pipe. The pipe to be tested was buried in filter material that was coarser on the 15% size than the average filter required. Application of water was not continued more than 20 minutes, as it was found that the filter material subject to washing would enter the pipe within this period. Table 1 shows the quantity of filter material washed in the various pipes tested and definitely indicates the inferior design of most commercial pipe.

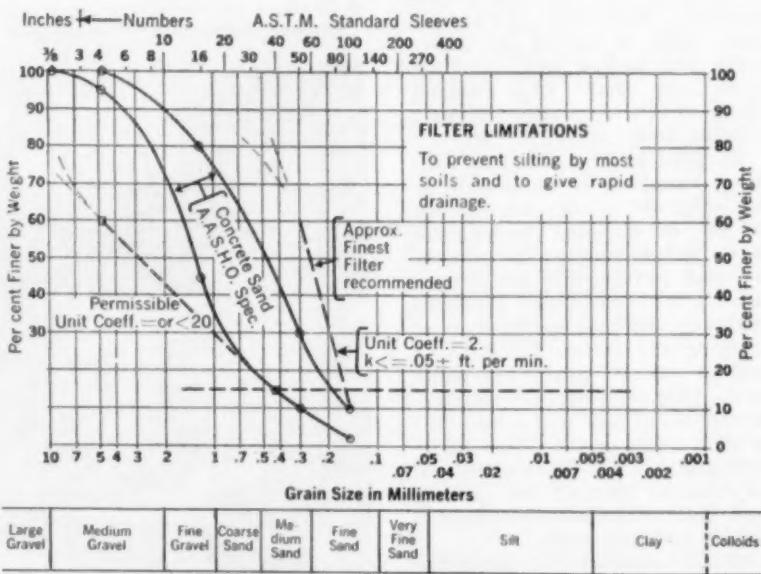
While the coated perforated corrugated metal pipe (Armco Hel-Cor) made a very creditable showing in the Vicksburg tests, the general results indicated that an uncoated pipe with $\frac{7}{16}$ -in. holes might not perform so well. The net diameter of the holes in the coated pipe was probably about $\frac{5}{16}$ -in. Therefore Armco conducted a series of tests to determine the size, number of holes and number of rows of holes to give ample water intake and yet eliminate the in-

(Continued on page 176)

STANDARD PERFORATIONS FOR HEL-COR PIPE



FILTER LIMITATIONS



U. S. Bureau of Soils Classification



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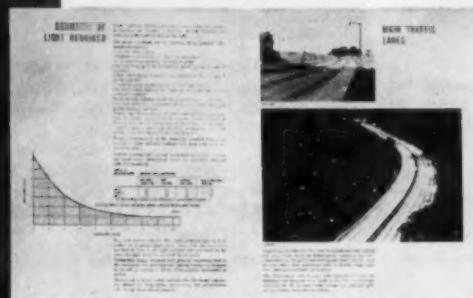
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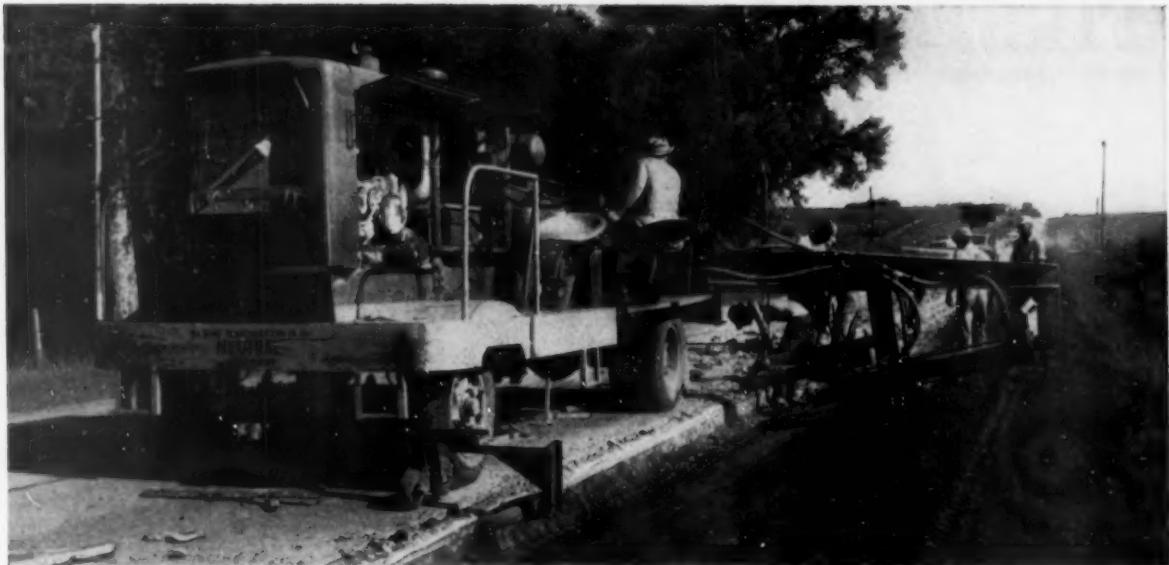
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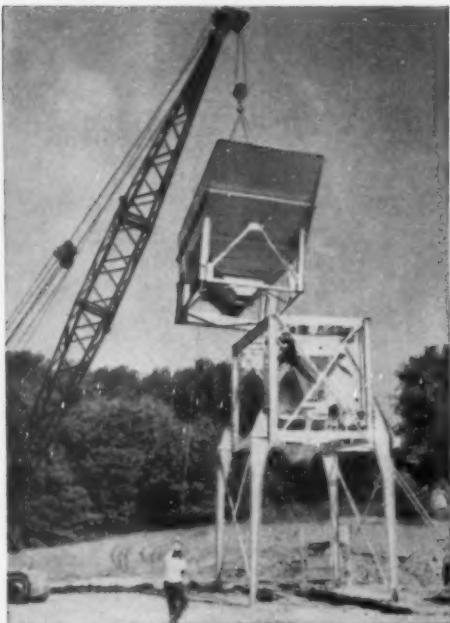
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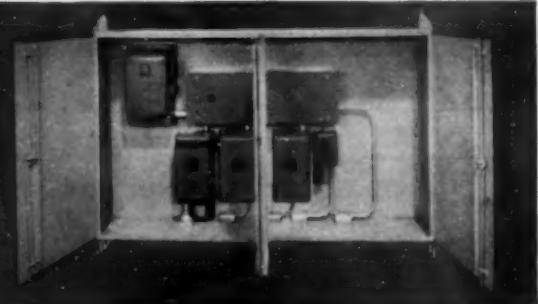
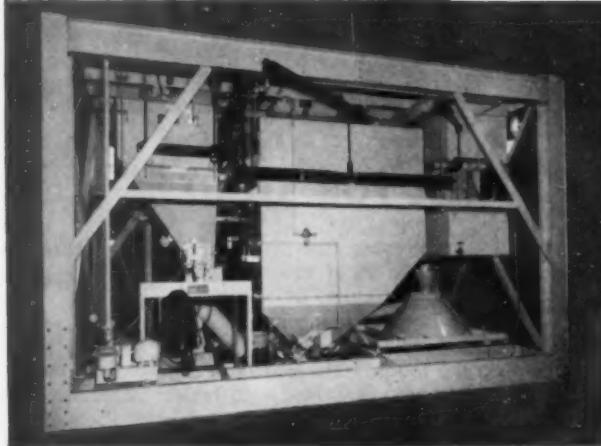
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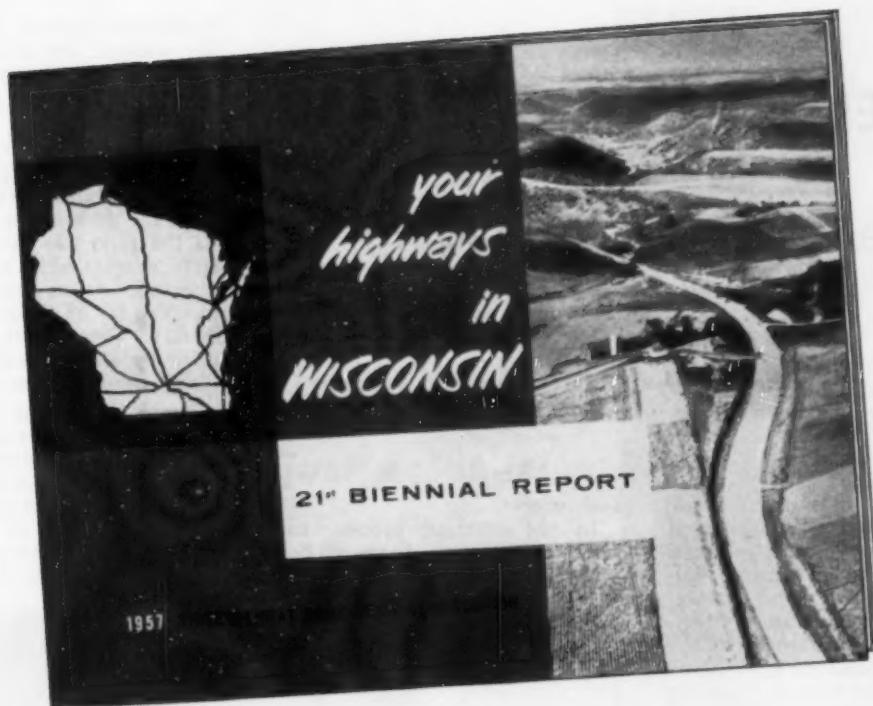
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"Your Highways in Wisconsin"

An example of how a highway department's annual report ought to look today.

THE HIGHWAY DEPARTMENT public information department in Wisconsin has just turned out an excellent example of what an annual report should be. The biennial report, "Your Highways in Wisconsin," is well-illustrated and simply written. It does a noteworthy job of revealing what the department has been accomplishing during the past two years. Even newspaper men assigned to cover the department regularly were impressed by this presentation of achievements in one package and the descriptions of highway needs in Wisconsin; how roads are administered, planned, and engineered; how contracts are let; how materials are tested; how highways are maintained; and a host of other activities.

William F. Steuber, Chief of Public Information for the Wisconsin department, and Cliff Hutchinson, Assistant Chief, teamed up to write and take photos for the report, although obviously with the cooper-

ation of the entire organization. Mr. Steuber told *Roads and Streets* last month that the attractive three-color, 64-page report has been widely acclaimed. Some 5,000 copies of the report were printed and distributed to legislators, daily, and weekly newspapers, highway department employees, county commissioners, public libraries and high school principals. Although production of the piece cost \$6,000, officials feel this is a small sum to set aside for telling the progress of a multi-million-dollar highway program.

Every year seems to see more highway departments swinging away from the deadly dull statistical-type annual report to the attractive, readable publications that really translate the story of what the organization is accomplishing with the highway dollar. It is very seldom that they are criticized for "glamorizing" their job, for the taxpayer is usually pleased to see that his money is being put to work so

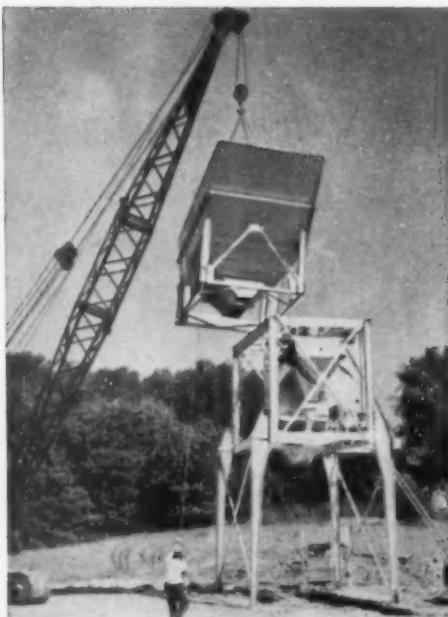
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The Wisconsin public information specialists are to be commended for a good piece of work and their administrators for recognizing the importance of this public relations job.

(The National Highway Users Conference is continuing to honor state highway departments for unusually attractive annual reports through its annual "Golden Milestones" awards program. For more information, write to Roy Jorgenson, National Highway Users Conference, National Press Building, Washington, D. C.)

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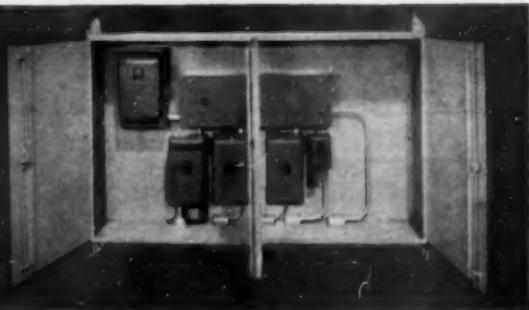
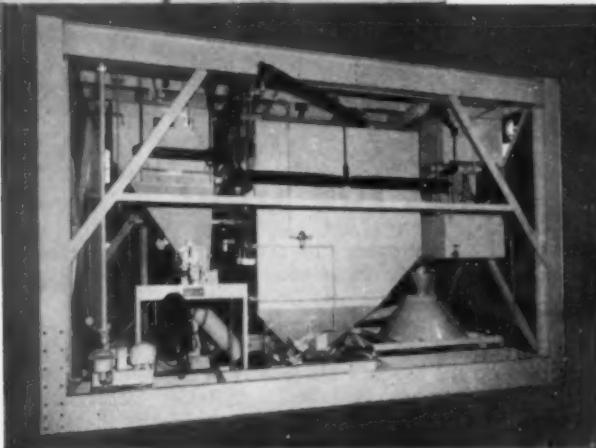


BUTLER

Portability

COSTS YOU NOTHING!

Your BUTLER HP-85 Ready Mix Plant
Pays Back the Cost of the
Portability Features the
First Time It's Erected



(Above) The Service Entry Panel provides all electrical connections.

(Left) The self-contained Butler HP-85 Batcher section has piping and wiring all in-place.

In the first place, the HP-85 is erected in hours instead of days. Bring it to your job-site today, you're pouring concrete tomorrow. And pouring is limited only by your crane and truck mixers.

Right there is an enormous saving in costly man and equipment hours.

Transport costs are low. All components are actually their own package. The bin is a unit complete with bracing. So is the batcher section, with air-piping and wiring all in place. Support columns are hinged to the batcher frame, swing into position as it is raised. The cement bin ships in one piece with legs attached and the two-piece

elevator comes with buckets and chains installed.

But here's the biggest saving of all:

BUTLER provides a complete electrical Service Entrance Panel. All circuitry is installed, all switches in place — everything ready to plug-in with quick connectors. Field wiring is eliminated, at a saving of thousands of dollars.

That's it. While the HP-85 was engineered primarily to be moved from job to job, many Ready Mix operators are buying it for permanent installation. Why? It *more* than repays the cost of these features in one installation.

Want more details about
the HP-85? Send for
this Bulletin. Just write
"HP-85" on a post card,
sign it and send it in.



... for more details circle 248 on enclosed return postal card

BUTLER BIN CO.

959 Blackstone Avenue • Waukesha, Wisconsin



"Your Highways in Wisconsin"

An example of how a highway department's annual report ought to look today.

THE HIGHWAY DEPARTMENT public information department in Wisconsin has just turned out an excellent example of what an annual report should be. The biennial report, "Your Highways in Wisconsin," is well-illustrated and simply written. It does a noteworthy job of revealing what the department has been accomplishing during the past two years. Even newspaper men assigned to cover the department regularly were impressed by this presentation of achievements in one package and the descriptions of highway needs in Wisconsin; how roads are administered, planned, and engineered; how contracts are let; how materials are tested; how highways are maintained; and a host of other activities.

William F. Steuber, Chief of Public Information for the Wisconsin department, and Cliff Hutchinson, Assistant Chief, teamed up to write and take photos for the report, although obviously with the cooper-

ation of the entire organization. Mr. Steuber told *Roads and Streets* last month that the attractive three-color, 64-page report has been widely acclaimed. Some 5,000 copies of the report were printed and distributed to legislators, daily, and weekly newspapers, highway department employees, county commissioners, public libraries and high school principals. Although production of the piece cost \$6,000, officials feel this is a small sum to set aside for telling the progress of a multi-million-dollar highway program.

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NOVEL ANTI-ICING SCHEME

Kept Bridge Job Going

Aeration pipe laid on lake bottom helped force warmer water to top, preventing ice from forming at Canadian bridge site.

CONSTRUCTION of a new highway bridge in one of Ontario's leading summer resort centers proceeded during the 1957-8 winter in sub-zero temperatures. The "secret" was an underwater aeration process which keeps the working area free of ice. The process has been adopted by Dravo of Canada Limited, Toronto, in building the substructure for a new four-lane carrying Highway 11 across Vernon Lake Narrows at Huntsville, 140 miles north of Toronto.

There, despite temperatures as low as 30 degrees F. below zero, their floating construction equipment was able to continue operating in a 200-ft.-wide strip of open water across the 800 ft. channel.

Although the scope of the work was curtailed somewhat because of the cold, Dravo engineers regard the aeration move as a substantial time-saver. They point out that Vernon Narrows normally is ice-covered for a period of four months

each winter.

In the aeration process, compressed air was passed through holes in a plastic pipe laid across the

floor of the channel. The air forced the warmer, denser water at the bottom of the channel to the surface, thus preventing ice from forming.

The pipe, which is 1½ in. in diameter and has $\frac{1}{16}$ -in. diameter holes at 10-ft. intervals, was laid from the deck of the derrick boat. As the pipe was played out, concrete weights were added at 20-ft. intervals. At its maximum depth the pipe lay 25 ft. below the lake's surface. Compressed air was supplied by an Ingersoll-Rand rotary diesel compressor on the shore.

Dravo built eight concrete piers and two abutments for the 810-ft. span. Each of the dumbbell shaped piers consists of two 12-ft. diameter reinforced concrete pile caps, embedding the tops of either six or eight 18-in. diameter pipe piles and joined by an 18-ft.-long, 4-ft.-wide



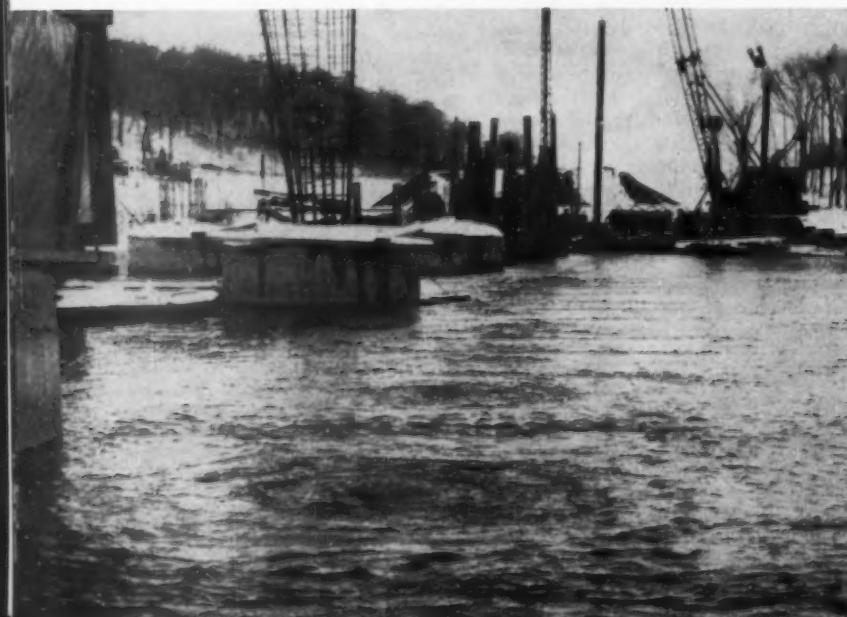
• Work on highway bridge across Vernon Lake Narrows at Huntsville, Ontario, is proceeding in sub-zero temperatures—note ice-free lake.

concrete strut. The pipe piling extend to bed rock as much as 80 ft. below water level.

Two derrick boats, a barge and a ferry were used in the project. Concrete was supplied from a one-cubic-yard mixing plant on shore and shifted to buckets on the ferry by an air-powered transfer buggy.

Dravo expected to complete its phase of the work during the 1958 spring.

• Showing turbulence on the surface, caused by compressed air passed through holes in a plastic pipe on the channel floor. With ice prevented from forming, Dravo of Canada was able to use floating equipment to build the bridge piers, despite -30° F. weather.



**You don't have to
weld it...
you just point it!**



STOODY SEMI-AUTOMATIC HARD-FACING
The fast way to take the work out of welding!

Hard-facing with the new Stoody Semi-Automatic Wires is *that easy!* You simply "aim" the wire and strike the arc. The semi-automatic machine does the rest...automatically feeds the wire at the correct rate, lays down a sound deposit—stringer bead or wash pass.

Man, it's a weldor's dream! No fluxes, no flux dams. Perfect visibility of the weld every inch of the way. And talk about speed—2 to 4 times faster than manual welding...ideal for covering big areas quickly, extremely handy for maintaining equipment between shifts! No changing of electrodes either...welding is continuous as long as there's wire on the reel and this naturally means an end to stub end waste.

With Semi-Automatic's low heat input and low penetration, there's less dilution of the deposit. *Less dilution means higher alloy content* with increased wear resistance, usually superior to manual electrodes of similar analysis. There's a complete line of wires with just the right analysis for every job!

TRY SEMI-AUTOMATIC HARD-FACING THIS EASY WAY—Your Stoody dealer will arrange for a semi-automatic demonstration in your plant—on your own job. (Check the yellow pages of your phone book for nearest Stoody Dealer.) Let him prove how Stoody Semi-Automatic Hard-Facing can cut your maintenance costs!

SEE OUR BOOTH NO. 617 AT THE WELDING SHOW, APRIL 15-17, 1958

STOODY COMPANY
11908 E. Slauson Avenue, Whittier, California

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"More highway work in 1958"

...say nation's construction editors
in state-by-state survey of lettings

How much new contract work will there be in your area this year?

For a realistic answer to that question, LeTourneau-Westinghouse has just polled America's construction publications. Purpose of the survey:

a down-to-earth appraisal of your specific *business opportunity*...as a roadbuilder...in 1958.

Because some highway progress reports are useless to contractors...in that they include projects years away from actual contract-letting...this L-W study has stressed *contracts*. Editors were asked not to

consider work still in land-acquisition or preliminary engineering stages...or for which money was merely "apportioned" or "obligated." Instead, they were requested to estimate the actual dollar value of *highway construction contracts to be let this year*...and to compare those figures with 1957 totals.

Here are the editors' reports:

EAST:

Publications in New England and Middle Atlantic states indicate highway lettings this year should *increase by about 30%* over 1957. Here are their comparisons:

	1957	1958	Source
Connecticut	\$ 34,547,230	\$ 40,000,000	NERBA
Delaware	23,000,000	25,000,000	Constructioneer
Maine	13,919,329	20 to 25,000,000	NERBA
Maryland	60,000,000	65,000,000	Constructioneer
Massachusetts	52,005,937	90 to 105,000,000	NERBA
New Hampshire	18,114,950	25,000,000	NERBA
New Jersey	65,245,000	92,000,000	Constructioneer
New York	246,440,000	280,000,000	Constructioneer
Pennsylvania	185,500,000	272,600,000	Constructioneer
Rhode Island	11,064,415	15 to 18,000,000	NERBA
Vermont	9,937,786	18 to 20,000,000	NERBA

Some background: "Good early pace of lettings indicates bright hopes for 1958 are accurate. Massachusetts, for example, has let \$21 million in contracts in first two months...that's 40% of total 1957 volume. And just two early spring jobs in Vermont will total more than the entire volume there last year." (Gordon Gaffney, *New England Road Builders Ass'n.*)... "Contract awards in our area should increase over 27%...and because some states were late in getting started in '57 awards, actual amount of work performed this year may be as much as 60 to 75% greater than last year." (George C. Stewart, *Constructioneer*)... "We agree—contracts let during the calendar year 1958 will be *far* in advance of the contracts let in 1957." (Herb Swartz, *New England Construction*)

Best way to handle new, bigger jobs profitably is with equipment geared to today's higher production needs. In scrapers, L-W Tournapulls® with low-wide Fulipak® scrapers, move more dirt faster than any other dirtmover on the market. There are two Fulipaks: 18-*yd* "C", and 27-*yd* "B". Also available is a roadable, utility 9-*yd* "D", with 138 hp. Check production figures, then ask for a demonstration.

SOUTH:

Some weak spots in this area, but over-all outlook is strong, according to editors. Here's the picture:

	1957	1958	Source
Kentucky	\$44,097,976	\$100,000,000	The Scraper
Louisiana	67,600,000	95,000,000	Construction News
Mississippi	46,786,700	51,910,000	Construction News
N. Carolina	63,754,000	125,000,000	Construction
S. Carolina	42,000,000	56,300,000	Dixie Contractor
Tennessee	55,153,525	111,280,000	Construction News
Virginia	52,035,000	142,000,000	Construction
W. Virginia	20,400,000	71,385,000	Construction

Additional comments: (Figures for Alabama, Florida, and Georgia not available as yet)... "Overall area has outlook for at least a 20% increase over 1957." (Roy L. Kerr, *Dixie Contractor*)... "From what we can find out, Kentucky's goal of \$100,000,000 in contract awards by early summer is definitely possible." (Wilson Harper, *The Scraper*)... "In most of our area, contractors can look for 33% more work than they had in 1957." (Ray Metzger, *Construction News*)... "Work is and has been picking up all along in this area. It's safe to say that there will be work for everybody in another six months." (Eddie C. Reid, *Construction*)



MIDWEST:

Forecasts from 7 publications indicate highway lettings in midwest will jump approximately 50%... from \$959 million in '57 to \$1,439 million in '58.

	1957	1958	Source
Illinois	\$105,000,000	\$180,000,000	Construction Digest
Indiana	30,000,000	120,000,000	Construction Digest
Iowa	93,500,000	136,000,000	Midwest Contractor
Kansas	65,200,000	75,400,000	Midwest Contractor
Michigan	162,700,000	200,000,000	Mich. Cont. & Bldr. & Mich. Roads & Const.
Minnesota	67,600,000	96,000,000	Construction Bulletin
Missouri	76,608,000	100,200,000	Construction News
Nebraska	33,000,000	48,000,000	Midwest Contractor
N. Dakota	32,800,000	36,000,000	Construction Bulletin
Ohio	200,000,000	300,000,000	Construction Digest
S. Dakota	34,500,000	46,000,000	Construction Bulletin
Wisconsin	58,100,000	101,900,000	Western Builder

Selected comments: "Early year pace of lettings in Wisconsin is way ahead of early '57. Makes plan for over \$100 million of work look very probable." (Earl P. Keyes, *Western Builder*) ... "In Minnesota, about \$60 million in contracts should be let before June 30. And in South Dakota, the full \$46,000,000 may be let in the first 6 months." (G. L. Anderson, *Construction Bulletin*) ... "Michigan has 5-year master plan for lettings that totals over \$1,200,000,000." (Maurice Baker, *Michigan Roads & Construction*) ... "Indiana's planned 300% increase may seem improbable, but 1957 was far below potential. Governor Handley and Highway Chairman Peters both describe the \$120 million program as 'one we know we can complete.'" (Arthur Graham, *Construction Digest*)

SOUTHWEST:

Here's the way construction publications in the southwest size up the '58 highway building year:

	1957	1958	Source
Arizona	\$ 38,570,000	\$ 41,650,000	Rocky Mt. Const.
Arkansas	20,327,000	48,500,000	Construction News
New Mexico	35,000,000	35,000,000	Rocky Mt. Const.
Oklahoma	37,962,000	41,759,000	Midwest Contractor
Texas	223,600,000	250,000,000	Texas Contractor

What they're saying: "That \$250 million Texas figure is not for right-of-way purchases, preliminary engineering, maintenance, or force account work. It is the amount that will be put under contract this year through road contractors." (Wm. B. Morrison, *Texas Contractor*) ... "Looks like a good year. Comparison of state highway lettings of 1957 to planned lettings for '58 shows an increase of about 13%. This has been confirmed by awarding authorities." (James I. Clayton, *Rocky Mountain Construction*) ... "Arizona's made a big jump in its highway spending. Its current fiscal year budget is 46.7% larger than last year's." (John D. Bowler, *Southwest Builder & Contractor*)

WEST:

One of the strongest areas of all in 1958 outlook, despite "leveling off" in some states. Here's the rundown:

	1957	1958	Source
California	Not available	\$220,000,000	SW Bldr. & Cont.
Colorado	\$55,900,000	57,500,000	Rocky Mt. Const.
Idaho	19,000,000	25,000,000	Pac. Bldr. & Engr.
Montana	27,000,000	46,925,000	Pac. Bldr. & Engr.
Nevada	13,700,000	32,366,000	Rocky Mt. Const.
Oregon	41,000,000	50,000,000	Pac. Bldr. & Engr.
Utah	20,370,000	41,120,000	Rocky Mt. Const.
Washington	51,000,000	55 to 65,000,000	Pac. Bldr. & Engr.
Wyoming	35,442,000	36,100,000	Rocky Mt. Const.

Observations: "Highway construction along the coast should be up about 25%." (Roscoe Laing, *Pacific Builder & Engineer*) ... "Note the tremendous gains planned in expenditures for Nevada and Utah. They're due to the fact that both states are now in position to place a large amount of interstate work under contract." (Jack Tarpley, *Rocky Mountain Construction*)



LeTourneau-Westinghouse thanks editors and publishers who helped prepare this survey... and hopes it encourages you as you plan for the construction season ahead.

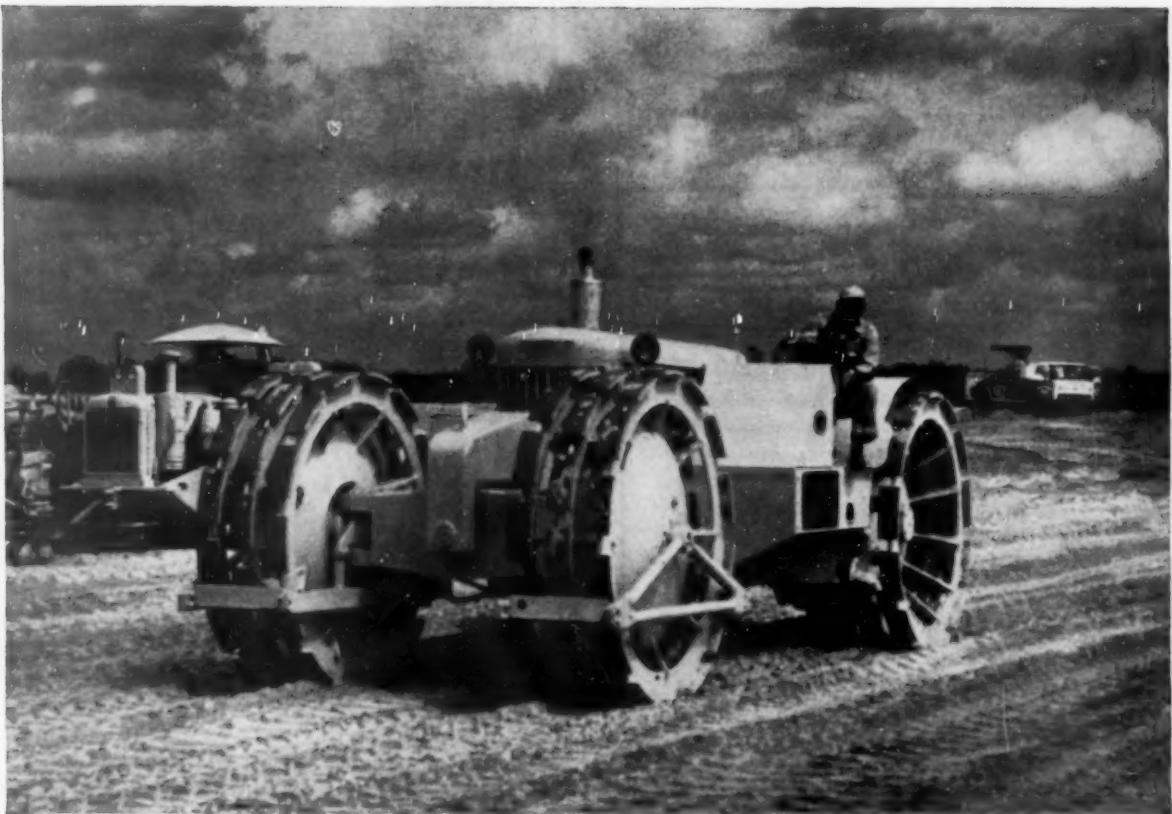
LETOURNEAU-WESTINGHOUSE COMPANY

PEORIA, ILLINOIS



A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit



Hyde and Cook's K-45 Kompactor* boosts daily compaction on 10-million cu. yd. job!

Few contractors ever have the compaction problem that faced Hyde Construction Co. and Cook Construction Co. when they started a \$4-million naval air station job in July, 1957. The joint-venture contract called for approximately 10-million cu. yds. of earthwork just north of Meridian, Miss.

First, density specifications were rigid. Second, the soil was wet and predominantly sand, with some clay.

*TRADEMARK



BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

... for more details circle 247 on enclosed return postal card

110

Third, the contract permitted 360 calendar days for completion, with \$500-a-day penalty clause—and normally *only about 180 days a year can be worked in the area!*

With a vast array of conventional compaction equipment, the contractors were able to average 50,000 yards a day. This meant at least 200 working days would be required.

By mid-September, however, compaction had been increased to 65,000 yards a day—thanks, in a large part, to a Buffalo-Springfield® K-45 Kompactor roller put on the job.

Boosting production and meeting rigid specifications is nothing new for the self-propelled K-45 Kompactor ... and here's why:

The K-45 operates on the "Interrupted Pressure Principle," which allows the machine to exert *all* its compaction effort *downward* ... for

uniform and maximum density ... in the fewest possible passes. The K-45's staggered rows of heavy steel "pads" individually enter loose materials with a minimum of displacement either forward or sidewise ... and then leave without disturbing the compacted areas in any way.

The Buffalo-Springfield K-45 Kompactor has proved itself as the top performer, the top money-maker for leading contractors throughout the country. Airfields, superhighways, military establishments—wherever the job is tough, specifications hard to meet and time short, you can count on the K-45 to do the job better ... faster ... and at the lowest possible cost!

See your Buffalo-Springfield Distributor today and get all the facts about the unusual Buffalo-Springfield K-45 Kompactor.

Never before
such durable
metal
protection



Proof M50 pigment Defense in Depth paints deliver up to 300% greater content of rust-inhibitive ingredient

Exposure tests make it plain! Paints containing M50[®] basic lead silico chromate pigment do more to prevent rust. Look at the panels above. These primers were applied (2.0 mils, dry) over rust and mill scale (to intensify severity of the tests), then exposed 12 months at Perth Amboy, N. J. in an industrial atmosphere and 12 months at Sayville, L. I. in a normal atmosphere at 45° South. Clearly, the rust arresting action of M50 pigment is significant.

Research analysis of tests like this prove an M50 pigment Defense in Depth paint provides substantially more rust-inhibitive action than comparable paints made with conventional pigments. You can see one reason for this. The configuration of the M50 pigment particle provides a more efficient way to take advantage of the well-known rust-inhibitive properties of the active ingredients (fused lead chromate).

Second reason for the improved anti-corrosive action of M50 Defense in Depth paint

systems is the versatility of the M50 pigment. Unlike other rust inhibitors, the inert-core particle is technically desirable and economically practical for use in intermediates and finishes . . . not just in primers alone. Each coat in an M50 pigment system can be given substantial rust-inhibitive properties in its own right. Hence total rust-inhibitive pigment content of some M50 pigment systems exceeds the rust-inhibitive content of comparable non-M50 pigment systems by as much as 300%.

See on the next page other ways M50 pigment Defense in Depth paints step up metal protection. See also how National Lead is prepared to help you get these superior specification products from your regular paint suppliers.



* Registered trademark of

National Lead Company

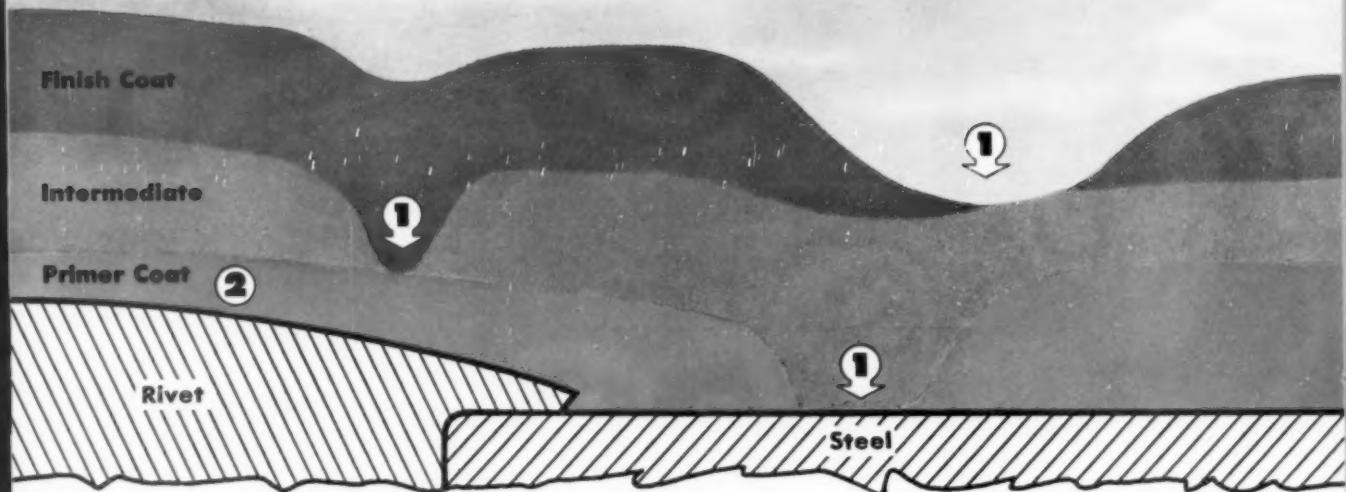
General Offices:
111 Broadway, New York 6, N.Y.



For more facts, turn page

1 "Holidays" in any coat of M50 pigment systems are less harmful . . . all coats provide **both** rust inhibition and weather resistance.

2 With M50 pigment Defense in Depth paints, thin deposit areas such as rivet heads, have more protection . . . paints "wet" pits and hollows, too.



Schematic section through 3-coat M50 pigment Defense in Depth system shows new paints provide two performance extras

Information on the preceding page proves that *M50** pigment Defense in Depth paints deliver inherent rust inhibition well beyond that available in other anti-corrosive paint systems.

Diagram above shows two additional performance extras. Because *M50* pigment coats give more protection over thin deposit areas . . . because breaks in *M50* pigment coats traceable to damage or painting mishaps are less harmful . . . the need for on-the-job spot priming and touch-up is greatly reduced. Then, too, *M50* pigment primer coats are not only rust inhibitive but also weather resistant. Re-priming is rarely needed.

Other advantages of *M50* pigment paints include a broad choice of colors in all coats, with excellent tint retention.

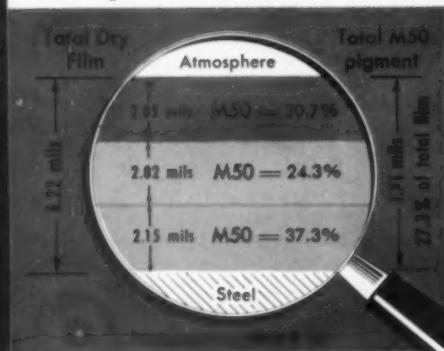
Are you responsible for steel structure maintenance?

If so, you are invited to examine exposure tests of *M50* pigment paints at National Lead's Sayville, L. I. test station. National Lead will also:—(1) send you a 24-page descriptive brochure, "Defense in Depth." (Mail coupon below); (2) provide technical aid in test applications; (3) help you develop suitable specifications for paints containing *M50* pigment.

For *M50* pigment paints themselves, contact your regular suppliers.

*National Lead Company trademark for a basic lead silico chromate pigment

Why *M50* Defense in Depth paints give you metal protection beyond all former concepts



In every coat . . . rust inhibition! Fused lead chromate is noted for rust-inhibition. The *M50* pigment particle structure permits paint makers to include large proportions of lead chromate in all coats of anti-corrosive systems.



2 *M50* pigment alkyd primer coats
Exposed 9 yrs 45° S
Each coat 1.5 mils dry film

M50 pigment finish
put on rusty steel
Exposed 4 yrs 45° S
in industrial atmosphere



3.6 mils
1.5 mils

Name your
own tint



In every coat . . . weather resistance! *M50* pigment is insoluble in water and has the excellent tint retention properties of fused lead chromate. Unlike other rust inhibitors, it actually boosts weather resistance of paints.

In every coat . . . your choice of colors! *M50* pigment gets along well with most tinting pigments, permits paint makers a wide range of colors . . . not only in intermediates and finishes but in primer coats as well. Colors stay true.



M50
Defense
in
Depth

National Lead Company,
111 Broadway, New York 6, N. Y.

Gentlemen: Please send me your 24-page brochure, "Defense in Depth." Include color card of the six *M50* pigment paints you recommend for steel highway structures.



Name _____ Title _____

Firm or Dept. _____

Address _____

City _____ State _____

New Products

Reader Service Numbers on Enclosed Postal Card



Type 84-T Four Axle Truck Crane

4-Axle Truck Crane

A new 70-ton capacity, four-axle truck crane has been added to the line of Baldwin-Lima-Hamilton Corporation.

The new model, designated the Type 84-T, is available in 8 x 6 carrier drives. Noteworthy in the Lima-designed and built carrier is the exclusive use of high strength T-1 steel in the main frame and frame components. Two full box section main members, joined by seven cross members, result in high strength and rigidity at reduced weight.

Special features include easily removable 'pin-on' type front and rear out-rigger boxes, roller-mounted outrigger beams, full length combination deck-fender design, large full vision operator's cab and full frame width engine compartment. Hydraulic steering. A special light-weight high strength extra long crane boom extendible to 190 ft. is available.

Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.

For more details circle 101 on Enclosed Return Postal Card.

Adams Motor Grader

The Adams "POWER-Flow 550" master grader brought out in March by Le Tourneau-Westinghouse, embodies the same design and construction as the standard "550" with the additional advantages of a torque converter drive train plus more engine horsepower. The "660" size "POWER-Flow" was introduced in the fall of 1956.

The new machine provides four forward speed ranges, from a creeping 0.22 mph to 26.4 mph. The instant reverse has an equal number of ranges from 0.21 mph up to 23.5 mph. Engine options are either the Cummins NHC 4-BI or the GM 4-71, both rated at 135 hp. With Cummins engine, the machine weighs 24,575 lb. With GM engine, the weight is 14,100 lb.

Le Tourneau-Westinghouse Co., Peoria, Ill.

For more details circle 102 on Enclosed Return Postal Card.

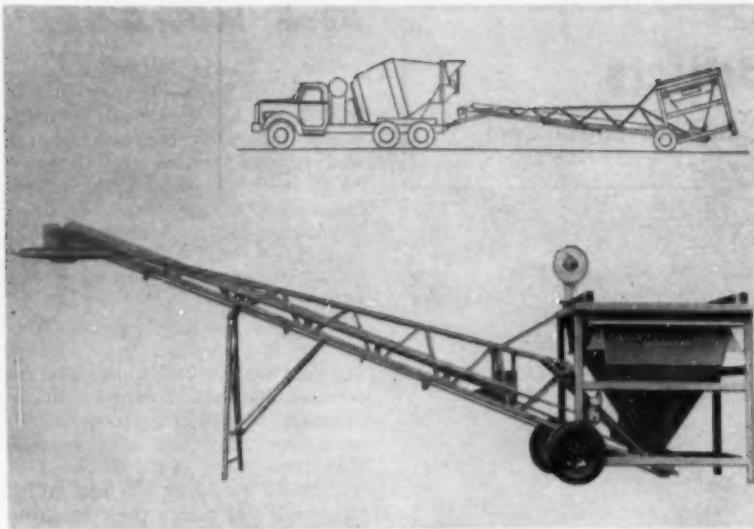
Portable Batcher

The Johnson "Tumbleweed," a portable batcher for charging transit mix trucks is now on distribution. It is self-contained, available in 3½ and 5-cu. yd. sizes, has capacities of 25 to 40 cu. yd. per hour, and is equipped with full-reading, cumulative 24-in. weighing scale which can be rotated for visibility from any direction.

The complete batcher can be towed while assembled, or the conveyor boom, bolted to the batching



"POWER-Flow Adams 550" Heavy Duty Motor Grader



"Tumbleweed" Portable Batcher

unit, can be removed for truck or rail shipment. For more permanent installation, it is available without wheels and discharge belt. Also available is a built-in water meter with piping.

C. S. Johnson Co. (Division of Koehring Co.) Champaign, Ill., and Stockton, Calif.

For more details circle 103 on Enclosed Return Postal Card.

Truck-Mounted Backhoe

To meet the demand for a trench digger to work in one area in the morning and at another miles away in the afternoon, Ottawa Steel Division of Young Spring & Wire Corp. has designed a truck-mounted backhoe for Chevrolet $\frac{3}{4}$ -ton trucks (and larger). A quick on-and-off feature leaves the truck free for other work when not needed for digging. To move from one work area to another, the backhoe is hydraulically shifted up and over the rear axle of the truck, and is driven at regular road speeds to the next jobsite, where it is readied for operation in seconds.

Digging depth is $12\frac{1}{2}$ ft. in any

position of the 190 degree swing. Standard buckets are 18, 24, and 30 in. wide. Ejector buckets, available in 14, 18, and 24-in. widths automatically force out all wet, sticky material.

Ottawa Steel Division, Young Spring & Wire Corp., Ottawa, Kan.

For more details circle 104 on Enclosed Return Postal Card.

Multi-Purpose Unit

The new Pitman "Hydra-Lift," Model 60HB, equipped with a hydraulic digger attachment and installed on the customer's truck with a Pitman utility body as here pictured, is designed especially for utility company, construction, and maintenance work. It provides in a single, self-contained unit, a piece of equipment that can lift loads of all kinds, dig a hole, and transport men, tools and materials.

Powered by the same hydraulic system as the "Hydra-Lift" itself, the digger attachment handles augers with diameters up to 24 in., and can dig a hole at any point with a 180 degree, 26 ft. radius of the truck.

Pitman Manufacturing Co., 300 W. 79th Terrace, Kansas City, Mo.

For more details circle 105 on Enclosed Return Postal Card.

Material Spreaders

A new hydraulically driven model of the Shunk-Torwel reversible spreader is stated to provide exceptionally smooth operation and to feature 100 percent reverse simply by movement of a control valve in the cab. Material that has caked or frozen in the hopper can



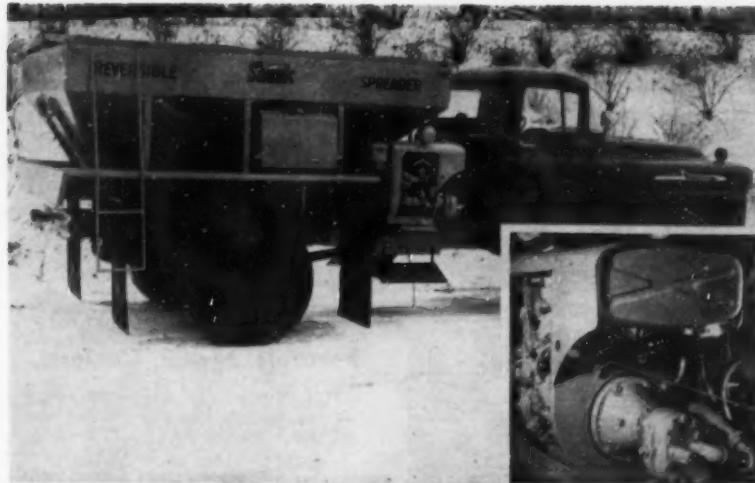
Pitman "Hydra-Lift" Model 60HB Equipped With Digger Attachment



Ottawa Backhoe on Chevrolet Truck

be quickly loosened by moving the control valve back and forth from forward to reverse for several seconds. This, of course, reverses the direction of the hopper's chain conveyor.

Another advantage of the hydraulic drive is that the hopper can be emptied quickly by opening the rear-end gate chute and reversing the chain conveyor. Normally 5 cu. yd. can be emptied in approximately 7 minutes. Power is from the



Hydraulically Driven Model of Reversible Spreader.
Insert shows close-up of Hydraulic Pump.

spreader's 18-hp engine directly to the hydraulic pump.

Shunk Manufacturing Co., Bucyrus, Ohio.

For more details circle 106 on Enclosed Return Postal Card.

Wheel Tractors

A new series of DW20 and DW21 wheel tractors, introduced by Caterpillar Tractor Co., are equipped with "Super-Turbo" engines which offer more power and greater operating efficiency. They are designed to provide a maximum horsepower output of 320, accompanied by significantly improved torque rise characteristics.

Of prime importance in the engines is the introduction of a new concept in diesel turbocharging—an improved air induction system, intended to improve on the normally high fuel-combustion efficiency and power output.

Caterpillar Tractor Co., Peoria, Ill.

For more details circle 107 on Enclosed Return Postal Card.

Simplified Base Paver

A new base paver attachment, Model P-160, designed for standard crawler-type tractors with sufficient power for its operation, is announced by Blaw-Knox. It is intended for the contractor whose base paving requirements do not warrant purchase of a complete self-powered base paver.

The attachment will spread stone, soil, and pug mix aggregates up to 400 tons per hour at controlled depths from 1 to 20 inches. The machine's normal 10-ft, 10-in

claimed to be especially effective in knitting the base compaction. The Model P-160 is similar to the P-150 base paver in hopper design only.

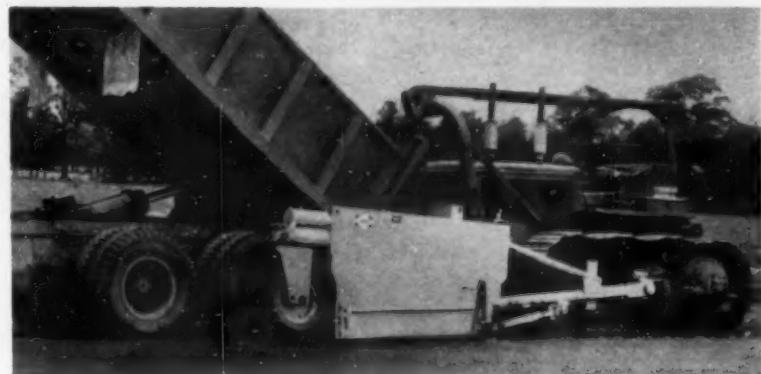
Blaw-Knox Company, Construction Equipment Division, Mattoon, Ill.

For more details circle 108 on Enclosed Return Postal Card.

Unitized Batching Plant

A new automatic aggregate batching plant designed by Heltzel Steel Form and Iron Company for highway construction work is stated to set up fast and dismantle quickly in 3 easy-to-handle sections that can be transported by existing equipment without the need of special permits.

The setup includes the new Heltzel E-4 cement plant with inte-

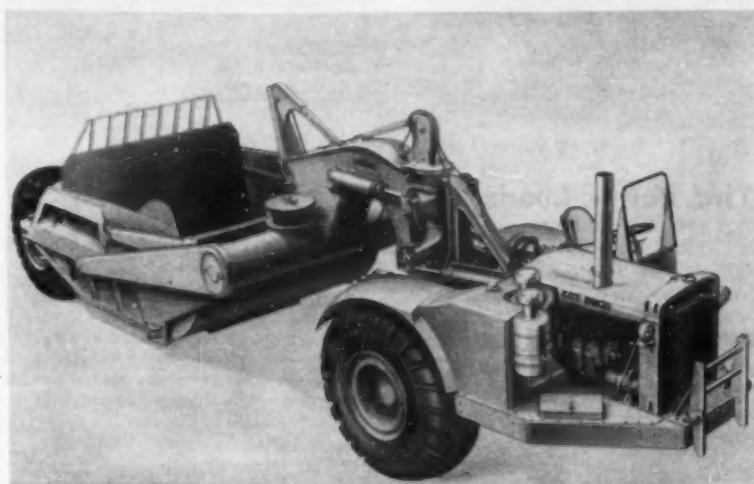


Blaw-Knox Base Paver—Model P-160

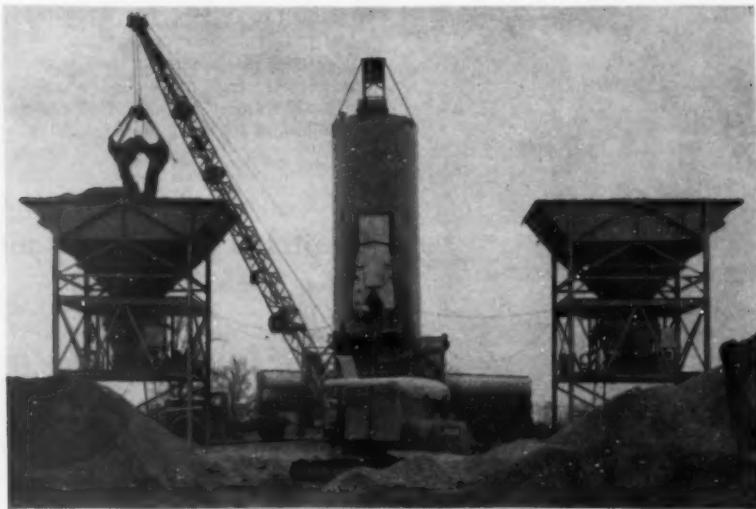
width can be blocked off to 7 ft, 2 in. Adjustable hinged hopper wings permit a maximum spreading width of 16 ft. A manually operated screw control provides simplified road crown adjustment. An exclusive angle type oscillating screed is

grated elevator and twin batchers.

The entire plant is arranged "in line" so that batch trucks can drive straight through. All batching mechanism operates automatically, being actuated by the truck driver who touches a button without leav-



Cat DW21 (Series D) Wheel Tractor Powered by 320 HP Cat Turbo



Heltzel's Automatic Batching Plant

ing the truck.

The Heltzel Steel Form and Iron Company, Warren, Ohio.

For more details circle 109 on
Enclosed Return Postal Card.



Daybrook Power Loader Handling Tire To Be Repaired

Tire Power Loader

A specially designed power loader (crane for truck) has been developed by Daybrook for use by contractors or tire manufacturers.

A special hydraulic jib on the 4,000-lb. capacity loader not only provides versatility of lifting movements but is also used to nudge huge tires on or off rims. Tube repair—such as on the 37.5 x 33 tire in the illustration—can be quickly made in the field by either the hot patch method or cold patching with

For more details circle 110 on
Enclosed Return Postal Card.

Mobile Lighting Unit

A mobile self-contained lighting unit for emergency and other outside work has been announced by Mercotec Corporation. Its patented feature is retractable light pole, 25 ft. in height when extended.

The light pole is mounted on a chassis with auto tires. Power source can be either an air-cooled 2-stroke or 4-

stroke gasoline engine, directly coupled with a generator. The engine also drives an air compressor which activates the telescopic pole, made of aluminum tubing. At the top of the pole is an adjustable reflector with a lighting capacity of 600 or 1000 watts. (Six 100-watt or five 200-watt bulbs) and a red obstruction light.

Mercotec Corporation, 24 Stone St., New York 4, N. Y.

For more details circle 111 on
Enclosed Return Postal Card.

Portable Water Coolers

A complete line of portable water coolers, now being marketed under the name "Arctic Boy." Sizes are 2 to 15 gallons. Distinctive features are complete hot-dip galvanizing which seals all seams on the inside and leaves the product leak-proof and sanitary and a further lining with baked-on "Sparkleen" plastic to keep the interior odor-free and taste-free indefinitely. Heavy duty and stainless steel models have styro foam insulation. All models are fully corrugated for impact and damage resistance.

Schlueter Manufacturing Co., 4616 N. Broadway, St. Louis 7, Mo.

For more details circle 112 on
Enclosed Return Postal Card.

Diesel "Pneumatractor"

A full diesel powered 125 "Pneumatractor" has been announced by Schram, Inc., utilizing the "Pneumadiesel" en bloc construction and rounding out their line of 125-cfm self-propelled air compressors. The diesel features are available in both the standard and heavy models.

Schram, Inc., 900 East Virginia Ave., West Chester, Penna.

For more details circle 113 on
Enclosed Return Postal Card.

Cummins Engine for R-18 Enc.

Euclid Division has announced the availability of a Cummins engine for the 18-ton rear dump, Model R-18. This engine (Model NH-6-B1) provides 220 hp and a top loaded travel speed of 26.7 mph. It is equipped with 5-speed transmission, 16.00 x 25 drive tires and hydraulic booster steering. Standard body carries 10½ cu. yd. A quarry type body with 11 cu. yd. struck capacity is also available.

Euclid Division, General Motors Corporation, Cleveland 17, O.

For more details circle 114 on
Enclosed Return Postal Card.

(Continued on page 121)



How Dodge saves you money by matching your truck to your needs

Dodge medium- and heavy-duty trucks have always been built from a wide range of "Job-Rated" components to match a truck exactly to your job. This means that you aren't forced to pay for capacity you don't need, and you don't get undersized units that shorten your truck's life. Just look at the range of components today's line of *Power Giants* offers:

In power, there are Sixes from 125 to 141 hp., Power-Dome V-8's from 204 to 234 hp. Exclusive Power-Dome V-8 design reduces harmful carbon deposits, greatly reducing the need for engine overhauls to maintain maximum power.

In payload, numerous Dodge medium- and heavy-duty models offer G.V.W.'s from 11,000 to 46,000 lbs., G.C.W.'s from 30,000 to 65,000 lbs. in gradual

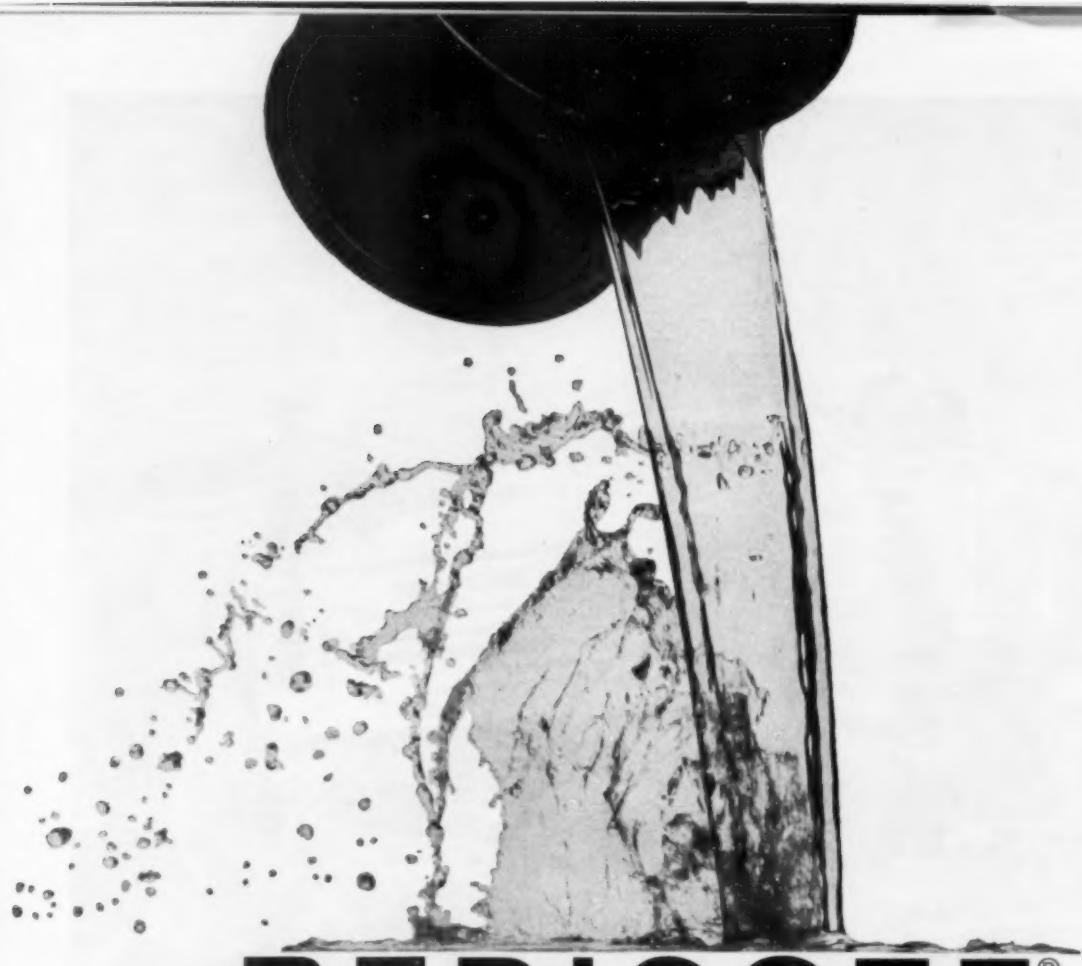
steps. A wide range of "Job-Rated" axles, transmissions, tires, springs and other components makes possible gradual increases in capacity and assures you a dependable, economical truck because it fits your job exactly.

In economy, Dodge provides the thriftiest and most efficient engine and transmission combinations. A range of eight engines and eight transmissions, including automatic Torqmatic, makes this possible. You save on gasoline, too, because Dodge engines operate efficiently on regular gasoline!

Priced competitively throughout the line, in many models Dodge is priced *lowest!* No matter what Dodge *Power Giant* your job calls for, you'll be agreeably surprised at its thrifty price tag. See your Dodge dealer soon, and get his special 40th Anniversary deal!

DODGE Power Giants

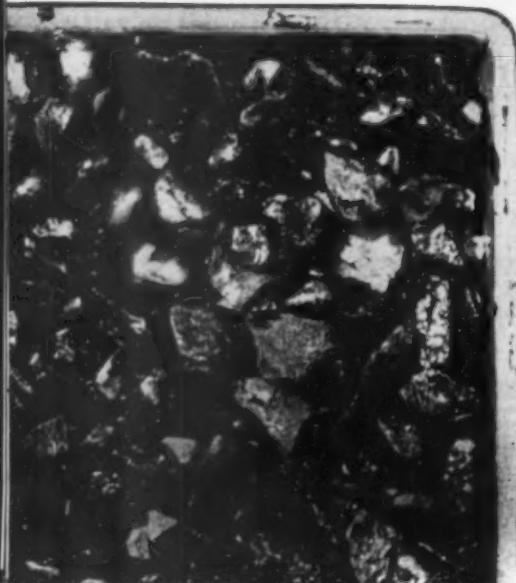
... for more details circle 256 on enclosed return postal card



REDICOTE®

**Rejects water and binds asphalt
to any aggregate**

Without Redicote



With Redicote



**New defense against
stripping!** In a simple,
dramatic test, two pans
of asphalt-coated damp
aggregate for pavements
were subjected to a steady
spray of water. One as-
phalt contained Redicote,
Armour's new additive—
the other didn't. The as-
phalt containing Redicote
did *not* strip. Here is con-
vincing proof that Redi-
cotes increase the stabili-
ty and durability of as-
phalt pavements.

**Armour's asphalt additives prevent stripping—
lock asphalt onto even water-soaked aggregates—
give you extra months of paving time each year.**

As little as 0.3% of an Armour Redicote asphalt additive in your asphalt formulation means the asphalt will stick and stay—even to wet and difficult-to-coat aggregates. You save money because you can use a much wider selection of locally available aggregates, and Redicotes work equally well on acidic or basic aggregates and gravel.

Radicotes reduce the need for pre-treating aggregates. They increase the efficiency of emulsified products and enable you to lay asphalt regardless of weather conditions. You can start earlier in the spring and work later in the fall. Whenever you pave, wherever you pave—Radicotes will prevent stripping.

All Redicotes are guaranteed uniform. One of three basic formulas will meet any asphalt requirement—hot or cold.



Look how Redicote 75 passed the Pennsylvania Wet Aggregate Coating Test! Only 0.4% Redicote 75 was added to MC-3 asphalt. No additive was added to the "control" asphalt. Then Pennsylvania aggregate was coated with the two mixtures under water. After mixing, the aggregate coated with asphalt containing Redicote still had a 95% coating. The "control" aggregate retained only 25% of its asphalt.

It is not necessary to modify the Redicotes or tailor-make a new asphalt formulation for every different paving situation. Speed and efficiency are substantially increased.

Radicote 75 is a 100% active, anti-stripping material. It is recommended for cold mix asphalt cutbacks where stability to extreme storage temperatures is not required. Both Redicote 75 and 2323 have proven to be outstanding wetting and bonding agents under the most adverse weather conditions.

Radicote 2793 is a 60% active anti-stripping additive, probably the most economical you can use for many aggregates. Its versatility, price and concentration required result in an asphalt additive that is right for most jobs.

Radicote 2323 was developed to meet the need for an anti-stripping additive where heat stability is important. It maintains its effectiveness after being subjected for 7 days to asphalt temperatures as high as 450°F. Ideal additive for cutback asphalts.

Samples of the Redicote asphalt additives are available for your evaluation and testing. We also would like to send you a copy of our *new* Redicote booklet which describes the Redicotes in detail.

Molecules of the Redicotes attach themselves with incredible force to stone surfaces, whether there is moisture present or not. The cationic surface active agents in Redicote squeeze away the water, and the "tail" of each molecule holds on to the binding asphalt with great tenacity. They actually change a water-accepting surface to an asphalt-accepting surface—and stop stripping before it begins.



I want to learn more about Redicote Asphalt Additives!

Please send me: The new Redicote booklet.

Sample of Redicote 75; Redicote 2793; Redicote 2323.

Additional data on Armour Redicotes. I am interested in coating the following type aggregate:

NAME _____

TITLE _____

FIRM _____

CITY _____ STATE _____

Armour Chemical Division • 1355 W. 31st St. • Chicago 9, Ill.
RS-4-58

Leader in Progressive Fatty Acid Chemistry



ARMOUR CHEMICAL DIVISION

© Armour and Company • 1355 West 31st St. • Chicago 9, Ill.
... for more details circle 235 on enclosed return postal card

ROADS AND STREETS, April, 1958



the profit you left behind

There it lays in the dirt. Your machines and equipment ground off in the grit, pounded off in the rock. You can almost see the wear that shut down your machines too soon . . . idled your men too long . . . bled your profits too much.

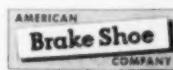
Is there *one* material, *one* metal that can stop this excess wear waste?

One? It takes many alloys, engineered alloys (some you may never have heard of). It takes a list of Amsco® Alloys to span the entire range of wear applications.

Amsco Alloys that can work a full shift where severe abrasion knocked out toughest metals in . . . for more details circle 234 on enclosed return postal card

three hours. Amsco Alloys that can belt rock all day, and work tomorrow, too. Amsco Alloys that can work any abrasion-impact combinations you face and still resist the wear, stop the waste . . . save the profit in the job.

When you need the *best* alloy for the job, you'll find it first among the Amsco Alloys . . . engineered by America's largest producer of cast manganese steel and specialists in wear-resistant metals.



AMSCO

American Manganese Steel Division • Chicago Heights, Illinois

ROADS AND STREETS, April, 1958

New Products

(Continued from page 116)

Air Concrete Placement

Model CP-10 "Airplaco" concrete placer, here shown in use on a typical job. A 105 cfm air compressor was used in this case to place a 1-2-3½ concrete mix with 1-in. rock, through the 4 in. id steel concrete placement tubing. This particular job requires a 25-ft. vertical lift and a total pipe length of 150-ft. Additional vertical lift and greater lengths of placement tubing can be used by increasing the air supply.

The new Airplaco concrete placers are available in two models: Model CP-10 which handles 10 cu ft of concrete per charge and Model CP-15 handling 15 cu ft per charge.

Air Placement Equipment Co., 1009 West 24th St., Kansas City 8, Mo.

For more details circle 115 on Enclosed Return Postal Card.



Placing Concrete With Model CP-10 "AirPlaco"

work. Speed selections to meet any job condition are available instantly in an easy-to-shift automotive type transmission.

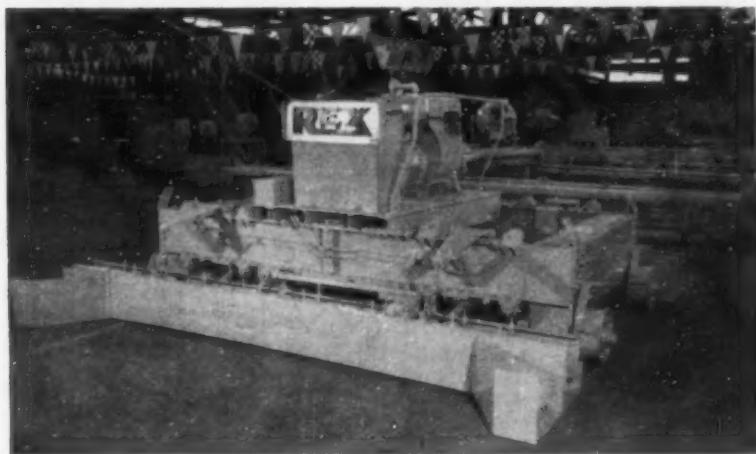
Chain Belt Co., 4701 W. Greenfield Ave., Milwaukee, Wis.

To add to operator comfort, the motor grader seat and seat back have been made fully adjustable. A redesigned cab increases operator visibility by providing 31 percent more glass area. The rear windows have been designed as sliding panels to allow easier ventilation and increased comfort. In addition, 6 in. in height has been added to the cab to allow more room, and insulation has been added to the cab roof as a sound deadener.

An outboard bearing has also been added to the steering booster on the No. 112, to give the impeller shaft greater load carrying ability.

Caterpillar Tractor Co., Peoria, Ill.

For more details circle 117 on Enclosed Return Postal Card.



"Rex" Concrete Finishing Machine

For more details circle 116 on Enclosed Return Postal Card.

Concrete Finisher

A new "Rex" concrete finishing machine gives the operator an unobstructed view with its centrally located grouped controls. Steering is automatic on radius work through a differential steering system.

A unique clamping adjustment system eliminates the use of nuts and bolts when frame widening is done manually. A hydraulically powered frame-widening system is available for the fastest width adjustment — particularly important on tapered lanes and interchange

Grader Improvements

Several design improvements have been introduced on the Caterpillar No. 112 motor grader. Versatility and service life have been increased on the 75-hp 21,000-lb machine by changes in several components. Kingpins and bushings are bigger, and a larger in-board spindle bearing has been incorporated. The overall turning radius has been reduced by 5 in. through the introduction of an improved steering arm.

Plastic Flashing Unit

A new flashing light barricade, "Sentry Safety-Flash," has a brilliant synchronized flash. The lights are built into the panel for protection against flying objects. The unit is ruggedly constructed and light weight, 2200 hours of continuous flashing is guaranteed with each new battery. The plastic flashing unit has an unconditioned guarantee against any damage or failure.

Traffic Equipment Corporation, 2064 South Bannock St., Denver 23, Colo.

For more details circle 118 on Enclosed Return Postal Card.

All-Hydraulic Sweeper

The new Saginaw-South Bend "400" all-hydraulic street sweeper was built with special attention to lowering maintenance and operating costs. It features an open-flow hydraulic system that drives and controls all sweeping, loading and dumping mechanisms. Constructed with a standard truck chassis,



Saginaw-South Bend "400" Sweeper

the sweeper can be quickly and easily serviced with standard replacement parts.

The sweeper can travel at speeds up to 55 mph and sweep at speeds from 1.5 to 25 mph. The hopper holds 4 cu. yd. and dumps from the rear. Conveyor life is prolonged by a new system that automatically compensates for bulky objects without jamming or breaking.

Municipal Supply Co., Dept. S-8, 2508 S. Main St., South Bend, Ind.

For more details circle 119 on Enclosed Return Postal Card.

Rotary Mower

A new heavy-duty McCormick No. 26 rotary cutter works effectively at fast tractor speeds in heavy growths of grass, weeds and underbrush. It mows a 5 ft. cut.

PTO-driven, and intended for use with 25-hp or larger tractors, the No. 26 is available in either "Fast-Hitch" or trailing models.

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.



McCormick No. 26 Rotary Cutter

For more details circle 120 on Enclosed Return Postal Card.

Pneumatic Drills

Three new percussive drills for medium and deep hole operations have been introduced by Chicago Pneumatic. In hard trap rock, the 4 1/2 in. heavy-duty CP-450DR model, mounted on a Chicago Pneumatic G-800 "Tracdrill" is reported as drilling 10 ft. of 3" hole every 7 minutes.

Both the heavier-duty CP-450DR and the 4 in. CP-400DR models have standard-neutral-reverse-rotation. The machined alloy-steel striking bar in the locked-in-shank chuck assembly is threaded for sectional steel. The CP-400DR drills 2 1/2 in. holes to 50 ft. or larger holes to lesser depths. For medi-

um operations the new 4 in. standard-rotation CP-400 drills 3 in. holes to 25 ft.

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.

For more details circle 121 on Enclosed Return Postal Card.



Chicago Pneumatic G-800 "Tracdrill"

Grading Attachment

The "Utilo-Scope", a new hydraulically operated telescopic grading and digging attachment, announced by Quick-Way Truck Shovel Co., makes possible a completely new wider range of jobs with the "Quick-Way" Model 125A truck crane.

The "Utilo-Scope" replaces the "Chore-Master" attachment introduced by the company last year. It incorporates a number of new improved features. The attachment boom extends to a radius of 31 ft. The bucket or grading blade swivels from side to side and opens and closes with a wrist action.

Quick-Way Truck Shovel Co., P. O. Box 1800, 2401 E. 40th Ave., Denver, Colo.

For more details circle 122 on Enclosed Return Postal Card.



Utilo-Scope Grading Attachment



Aerosol Rope Lubrication

Wire Rope Lubricant

Lubricant applied with aerosol spray penetrates to the heart of wire rope and is said to prolong rope life as much as 300% in some cases. Here shown is a 16-oz push button can.

The Whitmore Manufacturing Co., Cleveland 4, Ohio

For more details circle 123 on Enclosed Return Postal Card.

A New Truck Loader

"The jaw swings down and reaches out to meet ground level approximately 13 inches forward of the lip of the bucket. Smoothly completing its closing cycle, the jaw pulls in and holds the full load bite in the 1/2-yd. bucket." This statement by M-B Corporation covers the distinctive character of the truck loader announced by it in March. The unit is designed to fit almost all types of truck without violating legal overall width restrictions.



M-B Corporation's Truck Loader

Advantages cited are that the powerful jaw action eliminates the necessity of ramming the truck into a stockpile to obtain a full bucket; when picking up small piles, the jaw fills the bucket quickly without "chasing" the material along the street and without need of hand sweeping or shovel clean up. The loader is said to be ideal for sweeper pile pick-up, sand and gravel operations, removing excess spoil, leaf pick-up, snow removal, street and highway maintenance, scavenging and yard work.

M-B Corporation, New Holstein, Wis.

For more details circle 124 on Enclosed Return Postal Card.

"Work Bull" Multi-Purpose Tractor Loader

The Massey-Ferguson "Work Bull 1001", just announced, can be converted into eight different machines easily and quickly (on the job if necessary) loader—street sweeper; hoe with its own backfill blade; fork lift—rotary broom—loader with a scarifier attachment. The operator can change directions or speed instantly without shifting, by switching from one foot pedal to the other.



"Work Bull 1001"

Maneuverability of the "1001" comes from power steering, individually controlled brakes, and 5 speed transmission in both forward and reverse. "Power to load" is automatically adjusted by a torque converter which provides extra torque where required. A special nitrogen accumulator cylinder serves as a shock absorber for the hydraulics when the unit is loaded and going over rough terrain. Payload with standard bucket is $\frac{7}{8}$ cu. yd. The machine has a 43-degree tilt-back with 5,200 pounds of breakaway power. With swinging crane, the capacity is 2000 lb.

Massey-Ferguson Industrial Division, Massey-Harris-Ferguson, Inc., 1009 South West St., Wichita, Kan.

For more details circle 125 on Enclosed Return Postal Card.

New Joint Sealer

Successful joint sealing with hot rubber-bearing compounds requires controlled temperatures at all points from the heating and melting compartment down to the nozzle at point of application and return to the compartment. In other words, both compound and heat transfer oil must be in constant circulation to eliminate overheating and cold spots. Accurately controlled



Cutler's "Uniflow" Joint Sealer

pressures and rates of flow are also necessary. Best results are secured when the compound is injected at its lowest efficient flowing temperatures, and at a pressure which forces it to the bottom of the joint.

These requirements, plus mobility and ease of operation with the power-propelled "Uniflow" sealer here pictured, are cited by the manufacturer as assuring first quality work and maximum economy.

Cutler Engineering Co., 5435 West 63rd St., Chicago 38, Ill.

For more details circle 126 on Enclosed Return Postal Card.

Barricade Safety Light

A new barricade safety light, the "Transista Flash" Model 410T uses a modern transistor circuit to lengthen battery life and produce approximately 1500 continuous operation hours from two standard 6-volt lantern batteries. The flashing head is two directional, with a choice of either red or amber optical plastic lenses. Flash rate is approximately 72 times per minute. There are no moving parts. The entire unit is waterproof, and the case is acid-proof lined. All-steel folding barricades, channel-type mounts and locking devices are available.

U-C-Lite Manufacturing Co., 1050 W. Hubbard St., Chicago 22, Ill.

For more details circle 127 on Enclosed Return Postal Card.



"Transista Flash" Model 410T

For more details circle 127 on Enclosed Return Postal Card.

Improved Transit Mixer

The Challenge factory is now in full production on the 1958 models of its "Pacemaker" truck mixers. Features of the 1958 Challenge include a new water tank location which gives the driver full vision to the rear of the mixer; a



1958 Challenge "Pacemaker" Mixer

new, recessed control panel; a new "Uni-lever", giving driver complete control of the mixer from either the rear or truck cab. New, hard-faced reinforcing flanges on mixing blades add service life. An automatic wash-down helps keep the discharge assembly clean.

Cook Bros. Equipment Co., 3334 San Fernando Rd., Los Angeles, Calif.

For more details circle 128 on Enclosed Return Postal Card.



Kohler L160 Engine

6 1/2 HP Water-Cooled Engine

A new compact, lightweight water-cooled engine developing 6.5 hp is now offered by Kohler Co. for applications where cooling air is limited and quiet operation is desired. The new engine, L160, was designed primarily for inboard marine applications but can be installed wherever bulk water or city water is available. A positive displacement sea water pump with neoprene impeller provides ample cooling. Temperatures are thermostatically controlled with the excess routed through a by-pass. The air cleaner is a dry aluminum mesh type which serves as a back-fire trap.

Kohler Company, Kohler, Wisconsin.

For more details circle 129 on Enclosed Return Postal Card.

(Continued on page 127)

Rising costs . . . shrinking profits . . . can you beat the profit squeeze?

Like most everything else, equipment costs have gone up and are still rising. The U. S. Bureau of Labor Statistics price index for construction machinery rose 6.7% over a year ago—and that figure doesn't include the recent price increases averaging 7% by equipment manufacturers.

But highway bid prices have held the line in the face of these higher equipment and labor costs. According to the composite mile bid price index of the U. S. Dept. of Commerce, there's been an increase of only one-tenth of one percent in the past year. Common excavation bid prices were up only 1.5% in the same period.

Costs Up . . . Profits Down

The obvious result of these higher costs, with bid prices remaining almost constant, is a real squeeze on the profit margin. It's probably the biggest factor in the 22% increase of business

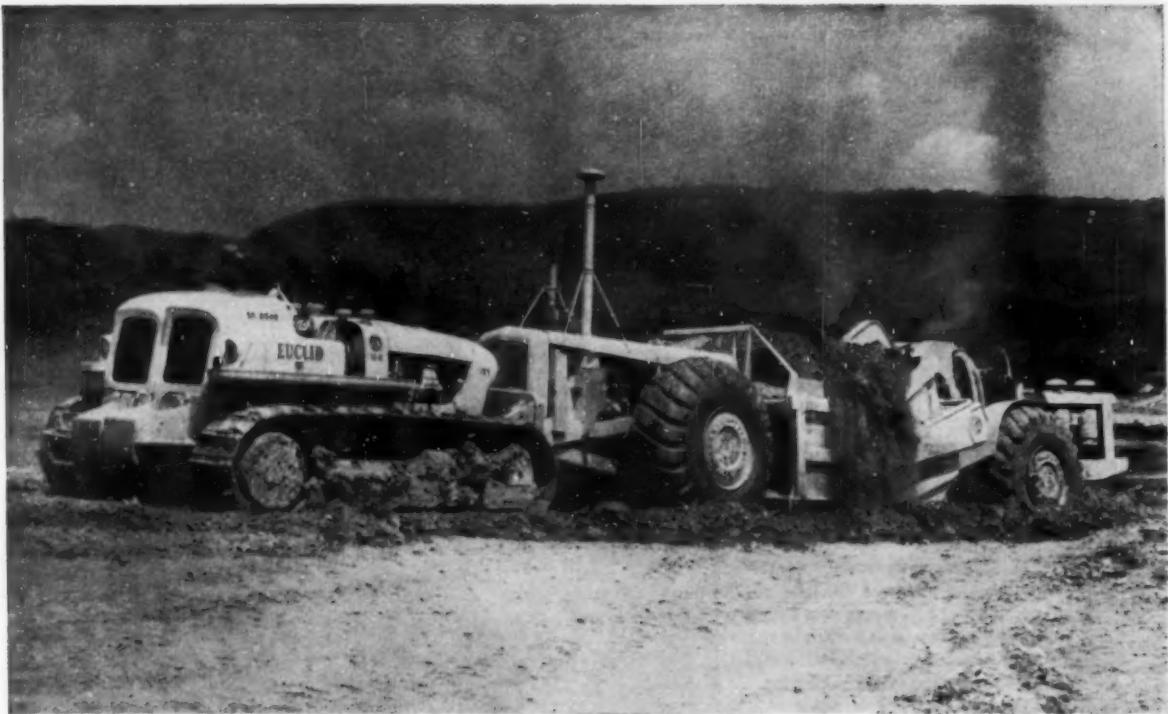
failures among contractors over last year. Net profits shrink fast under these conditions unless men and machines produce more. How to get this increase in production is the problem facing most dirtmoving contractors.

What's the answer?

With competition keeping bid prices almost constant, and with equipment and labor costs going up, modern earthmoving machines are the best bet to protect profits. Careful cost analysis may show that a partial replacement of your equipment—using a more efficient tractor for push loading scrapers, as an example,—would pay off in more yardage. Or your study may show that a change-over to other sizes or types of equipment would improve profits by a good margin.

The "Twin" Scraper has unequalled work-ability . . . works efficiently as a one-man earthmoving spread because it self-loads and can handle a wide range of assignments.





On big yardage, high production jobs the "Twin" team of Euclid TS-24 Scraper and TC-12 Crawler moves dirt faster and cheaper than any other combination of equipment—under good conditions or on the toughest going you've ever seen.

For instance . . .

Let's assume you're using a spread of three 18 yd. scrapers push loaded by a 200 h.p. tractor . . . job management is excellent and operating conditions on all phases of the project are good . . . but you bid close and your profit margin is pretty thin. To move more yardage you consider using a bigger tractor to get better loading performance with these three scrapers. One manufacturer has pointed out that this larger crawler could boost production by 20% and effect a 12½% reduction in cost per yard. That's certainly a big improvement in your profit picture.

But suppose you want to obtain the maximum profit potential from your job . . . you consider another possibility . . . the use of Euclid "Twins" in place of your original equipment spread. Again assuming the same job conditions, here's what the production and

cost figures would show. With 2 Model TS-24 Twin-Power Scrapers and a TC-12 "Euc" Crawler, you'd get 45% more yardage than you would with the spread of 3 scrapers and 200 h.p. tractor . . . and you'd save 23% in your cost per yard. If job conditions were really tough, the return on investment would be even greater. It's earning power like this that has helped contractors with "Twins" beat the profit squeeze on all kinds of work.

On the Highway Program

Euclid Twin Scrapers and Crawlers are moving the cheapest dirt in all parts of the country. On the Illinois Toll Road, for example, 8 contractors are using a total of 50 "Twins" and many of these 24 yd. "Eucs" work under adverse conditions that stall other scrapers. More and more contractors are finding Euclid "Twins" have more earning power than any other equipment. If you haven't checked the facts and figures, have a Euclid Dealer show you why "Twins" give you a bidding advantage and are your best investment.

Engineered to fit the job . . .
Euclids are your best investment



EUClid DIVISION
General Motors Corporation
Cleveland 17, Ohio

... for more details circle 277 on enclosed return postal card

For mechanical • cement • bituminous • lime • chemical and lime-fly-ash stabilization of: Highways • Streets • Airports • Parking Areas • Levees



SOIL STABILIZATION FOR HIGH TYPE PAVEMENT BASE REQUIRES THIS QUALITY SPECIFICATION FOR PROCESSING:

"Mixing of soil and/or soil combination and additives shall be accomplished by the use of a single pass traveling mixing plant of the type which leaves the material spread for immediate compaction."

P&H SINGLE PASS STABILIZATION METHOD builds sub-bases exactly as they are designed

Specifications designed around the single pass method of soil stabilization give accurate control. You can maintain the same high degree of uniformity of mixing as that obtained by laboratory methods.

P&H is the *only* firm offering a true, single pass traveling mixing plant. The P&H Single Pass Soil Stabilizer is designed and built specifically to conform with single pass operation, *regardless of soil*. In a single pass, with one operator, at a rapid rate of speed, it performs these essential operations:

1. Proportions materials in accordance with laboratory design.
2. Pulverizes fine grained soil.
3. Blends all materials uniformly.

... for more details circle 287 on enclosed return postal card

4. Adds specified amount of liquids accurately.
5. Mixes all materials to high degree of uniformity.

Look to P&H for accuracy, speed and economy on all types of single pass operation for soil stabilization.

Before you design your next sub-base structure, send for your copy of the P&H File-Folder series, "Low-Cost Highways". Write Dept. 535-A, Harnischfeger Corporation, Milwaukee 46, Wis.

HARNISCHFEGER

Construction and Mining Division
Milwaukee 46, Wisconsin

New Products

(Continued from page 123)

Industrial Tractor Shovel

Five major factors are listed as contributing to the high work capacity of the Y-18 tractor shovel, currently introduced by Yale & Towne: a 2500-lb. carry capacity; full 6-ft. high dumping clearance; fully automatic Yale torque transmission which eliminates clutch pedal and manual gear changing; rapid acceleration, 0 to 8 miles per hour in $3\frac{1}{2}$ seconds, and a top speed of 13 miles per hour; forty-five degree bucket tip-back at ground level providing the best possible loading action and low level carrying position.



Y & T's New Tractor Shovel

The unit is being introduced with a range of bucket capacities from 10 to 27 cu. ft. It will also be made available with a variety of attachments for specialized handling requirements. Power source is a 6-cylinder Model 30 Chrysler industrial engine rated 66 hp at 2000 rpm, for either gasoline or LPG fuel.

The Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

For more details circle 130 on Enclosed Return Postal Card.

New Vibrating Screen

A new horizontal vibrating screen, called the "Screen Master," is announced by Universal Engineering Corp. Outstanding features include the replacement of conventional flat springs with cylindrical arms called "drag links;" clamp bars with rounded edges to make radial contact with screen wire; removable feed-box side plate; hydraulic bearing removal; and interchangeable parts.

Universal Engineering Corp., Cedar Rapids, Iowa.

For more details circle 131 on Enclosed Return Postal Card.



The "Screen Master"

Light and Barricade

A combination transistor warning light and collapsible barricade unit (called "Neo-Flash-Code") has been announced.

Three models of the warning lights are available for use with the barricade: the TR 1-100 with a 360° lens and 8 beam candle power; the TR 0-100 with a 2 direction lens and 8 beam candle power; the TR 4-100 super-brilliant light with a reflectorized head and 15 candle power. These models have no moving parts and will operate on two 6-volt lantern cell batteries for 2200 hours continuously, with an 85 per minute flash rate.

Neo-Flasher Manufacturing Co., 3210 Valhalla Drive, Burbank, Calif.

For more details circle 132 on Enclosed Return Postal Card.



"Neo-Flash Code"

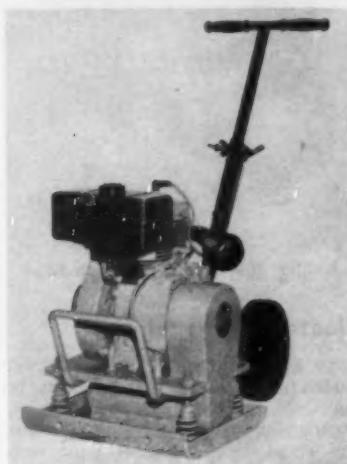
Vibratory Compactor

A new self-powered vibratory compactor, the "Power-Pactor," has been designed for fast, low-cost compaction on construction and asphalt paving jobs.

With variable frequencies from 2,400 to 7,000 vpm, and a compacting force up to 4,000 lb., it is stated to produce uniform Proctor densities on any jobs. Damping springs isolate vibration from the 6-hp air cooled engine and the operator's handle. The $\frac{5}{8}$ -in. alloy steel compacting plate has 12×18 in. of effec-

tive area. Electric power is available if preferred.

Maginniss Power Tool Co., 154 Distl Ave., Mansfield, O.



Power-Pactor Compactor

For more details circle 133 on Enclosed Return Postal Card.

New Idea in Forms

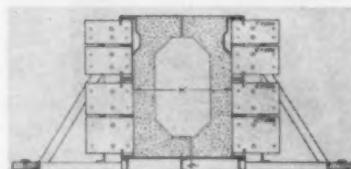
Steel forms adaptable to the production of a range of shapes as well as sizes of prestressed concrete members has been introduced by Blaw-Knox.

Key to the form is its unit design. Sidewalls are made up of a series of panels which can be varied in several ways to produce the desired end result. The panels can be re-arranged in sequence from top to bottom. They can be shifted horizontally, and when necessary, over-all height can be adjusted with addition of filters. The side panels are held in position on a separate frame by adjustable plates on either side of the form, a series of punched holes permitting lateral or vertical adjustment. A form has been designed with 7-, 8-, 9-, and 10-in. panels to make building beams, I-beams, and hollow box girders.

A typical form of this type, consisting of a series of panels of 7 in., 8 in., 9 in., and 11 in. height makes possible all four of the approved AASHO and PCI bridge beams.

Blaw-Knox Co., 300-6th Ave., Pittsburgh 22, Pa.

For more details circle 134 on Enclosed Return Postal Card.



Forms for Box Girder



Kohler Model 1.5M 25 With Idler

Electric Plant Idler

An idling device for three portable models of Kohler electric plants reduces the speed of the plants when operating under "no load" conditions, and keeps them idling at 1,400 rpm. Speed increases to the regular operating rate of 3,600 rpm as soon as load is applied, and drops again to 1,400 rpm the instant load is removed. Under average conditions of use of the device, the company estimates a saving of $\frac{1}{3}$ in gasoline consumption.

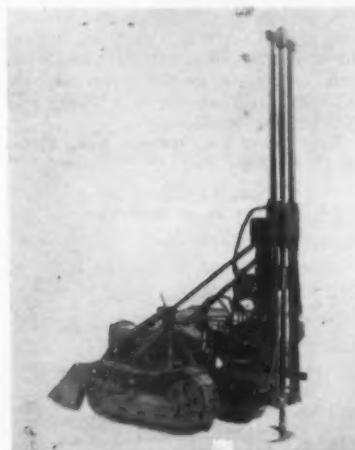
Kohler Co., Kohler, Wis.

For more details circle 135 on Enclosed Return Postal Card.

Semi-Hydraulic Digger

A new Prewitt low-cost semi-hydraulic digger that attaches to any industrial tractor to cut up to $6\frac{1}{2}$ ft., is operated by one man and utilizes full weight of the tractor to make from 6 to 20-in. straight holes in clay, shale, gumbo, sandstone, tree roots, or frozen ground.

Tempered auger turns from tractor power take-off, and hydraulic pump exerts continuous pressure on hydraulic cylinders to maintain steady downward drilling force. Hydraulic "outriggers" are included for additional stability, or



Prewitt Semi-Hydraulic Digger

for use in leveling tractor to assure accurate drilling on uneven ground.

J. R. Prewitt and Sons, Pleasant Hill, Mo.

For more details circle 136 on Enclosed Return Postal Card.

4-Wheel Drive Tractor

A new four-wheel drive, four-wheel steer tractor, called the Napco "Crab," has a three position selector that allows the operator to choose front wheel steer, front and rear wheel steer, or oblique steer. (Both front and rear wheels turn in the same direction.) The transmission slows the tractor to reverse without stopping or shifting gears. A special torque converter allows it to furnish maximum horsepower at slow speeds and provide increased digging or lifting effort whenever required.



Napco "Crab" Tractor

The tractor also has the following features: 4-wheel power steering, 4 speeds forward and 4 speeds reverse, 360 degree swivel seat, 4-wheel hydraulic brakes, mechanical PTO and an extremely short turning radius.

Napco Industries, Inc., Seventh St., North Lyndale, Minneapolis 11, Minn.

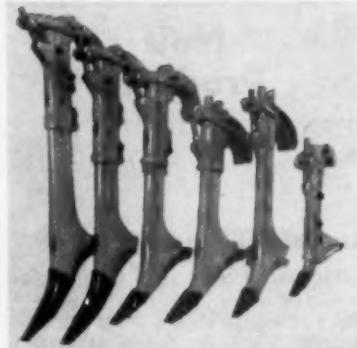
For more details circle 137 on Enclosed Return Postal Card.

Heavy Duty Ripper

Longer life is claimed for the Hensley heavy duty rippers because of the use of a new Boron alloy, which permits a deeper and more uniform throughout, with no impairment of tensile strength. The ripper fits any size "cat," even the D-g's. They are adjustable and interchangeable and will fit any dozer with a 39 in. to 61 in. blade height. Installation and removal are quick and easy, and can be handled by one man.

Hensley Equipment Co., Inc., 800 Peralta Ave., San Leandro, Calif.

For more details circle 138 on Enclosed Return Postal Card.



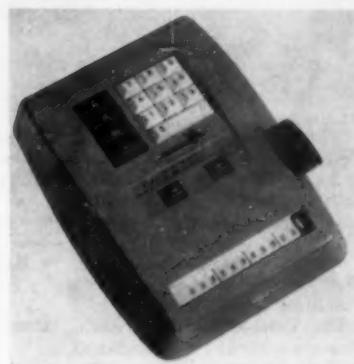
Hensley Heavy Duty Ripper

10-Key Calculator

A 10-key "personal calculator" that adds, subtracts, multiplies and divides, and weighs only 6 lb., has been introduced by Bohn Duplicator Corporation. The BDC "Contex" is manually-operated, but has no "handle" in the ordinary sense. It is said to attain speeds that equal or exceed those of electric machines. Capacity in ten digits entered, eleven total. Sub-totals are shown at every step, and subtraction is direct.

Bohn Duplicator Corporation, 4414 Fourth Ave., New York 16, N. Y.

For more details circle 139 on Enclosed Return Postal Card.



BDC "Contex" Calculator

Industrial Tractor and Attachments

Here shown is the new Massey-Ferguson industrial tractor, the "Work Bull 202," equipped with Davis front-end loader and backhoe. It has a 40-hp high torque engine, full-time power steering, and individual turn brakes that can be interlocked for simultaneous use.

Beside the Davis loader and backhoe, the following attachments are available: crane, fork lift, "Duburn" trencher, angle dozer, scarifier, tipping trailer, pipe and cable layer, side-mounted mower, scarifier-scraper, multi-purpose blade, soil scoop, cordwood saw and special buckets. Maneuverability and close

Avoid One Cause
of Air Line Leaks
and Pressure Loss

"BOSS"
Self-Honing
AIR VALVES



Female I. P. T.
Both Ends

Built to withstand the hard knocks of mining and construction service, "BOSS" Valves are also ideal for general use on pipe lines, hose lines, compressor tanks, etc., and for the handling of water. They do not require packing.

Bronze plug firmly seated by spring tension against harder metal of valve body is automatically honed to perfect seat as handle is turned. A straight, full-flow opening extends through valve body and plug, providing greater capacity with no friction loss. Valve opens or closes by a quarter turn of the handle.



INTERNALLY ATTACHED HANDLE—
In sizes $\frac{1}{4}$ " to $1\frac{1}{2}$ " valve stem and handle are combined in a strong one-piece forged steel unit which is anchored to the bronze plug within the valve body. This patented feature eliminates stem and handle breakage. Sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and $2\frac{1}{2}$ " have externally riveted handles.

Stocked by Manufacturers and Distributors
of Industrial Rubber Products

DIXON
Valve & Coupling Co.

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
BRANCHES—CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON
DIXON VALVE & COUPLING CO., LTD., TORONTO. Associate Companies
Frost Iron Company Inc., Brooklyn, N.Y. • Pneumatic Division, Union Carbide, Carteret, N.J.

... for more details circle 265 on enclosed return postal card

ROADS AND STREETS, April, 1958



The "Work Bull 202" with Davis Front-End Loader and Backhoe

quarter operation are featured. With the backhoe, the 202 digs flush alongside buildings, fences or other obstructions.

Massey-Ferguson Industrial Division, Massey-Harris-Ferguson, Inc., 1009 South West St., Wichita, Kansas.

For more details circle 140 on
Enclosed Return Postal Card.

Finishing Screed

A double-action finishing screed that vibrates, compacts and levels concrete through a high frequency slapping action has been developed by Thor Power Tool Co. It features exclusive "two-beam" construction with steel strapping vibratory mechanism.

The unit is powered by a gasoline engine that actuates a series of steel straps between two beams, delivering the high frequency slapping action on the surface of the slab. The screed is available in 7, 10, 13 and 16 ft. lengths.

Thor Power Tool Co., Prudential Plaza, Chicago 1, Illinois.



Thor Vibratory Screed

For more details circle 141 on
Enclosed Return Postal Card.

(Continued on page 132)

TWIN FACTS



a report on the
cost-cutting performance
of Euclid "Twins"

**Twins move
the cheapest dirt!**

An Oregon highway job involved 1,300,000 yards of excavation. Despite having to move ripped and shot rock weighing 3000 pounds per bank yard, the contractor used a spread of two Euclid 24-yard "Twins" and two 21-yard single engine scrapers push loaded by 300 h.p. crawlers. The 1800' haul followed the centerline of the new road over incomplete fills of minus 12%, plus 14%, and minus 12% grades.



Time study and weight figures for the two types of scrapers working under the same conditions show over 50% more production for the Twin-Power Scraper. Each "Twin" moved 143 bank yards per 50 minute hour while the single engine rig moved only 91 yards. This higher "Twin" production cut costs by better than six cents per yard!

For more details on this job, ask your Euclid dealer for Twin Facts No. 23... he can show you why Euclid "Twins" give you a bidding advantage.

**EUCLID DIVISION, General
Motors Corp., Cleveland 17, O.**

... for more details circle 276 on enclosed return postal card

For Today's Most Complete Line of Quality

TIMKEN-DETROIT[®]

SPECIFY...



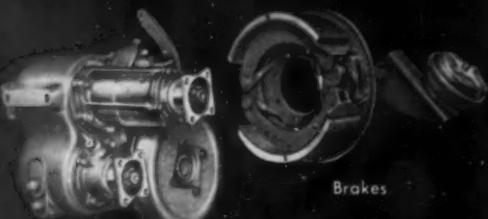
Lightweight
Driving Tandems



Trailer Axles



Heavy-Duty
Driving Tandems



Brakes



Gear Boxes



Single Driving Axles



Front Axles

Whether your requirements call for highway or off-the-road equipment—Timken-Detroit offers torture-tested axles and brakes proven by almost 50 years of field testing and laboratory research!

Timken-Detroit meets all your requirements for driving, trailer and front axles . . . brakes and gear boxes . . . with a complete range of capacities in each product category. Shown here are some of the units included in the complete line.

Nearly 50 years of manufacturing experience—plus continuing field and laboratory research—have taught Timken-Detroit the exacting needs of the trucking industry. Timken-Detroit Axles and Brakes are designed and built to give you the utmost in service, safety and dependability.

To you—this leadership in power transmission and braking systems means more productive road time, reduced operating costs and lower maintenance expense. Timken-Detroit Axles and Brakes are engineered to carry more payload . . . and stop more payload . . . at lower operating costs under all conditions.

The Timken-Detroit line of Medium and Heavy Duty Double-Reduction Tandems is an example of the superior engineering features and quality built into every Timken-Detroit product.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York
Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

TIMKEN
Detroit
AXLES

TIMKEN DETROIT AXLE DIVISION

ROCKWELL SPRING AND AXLE COMPANY

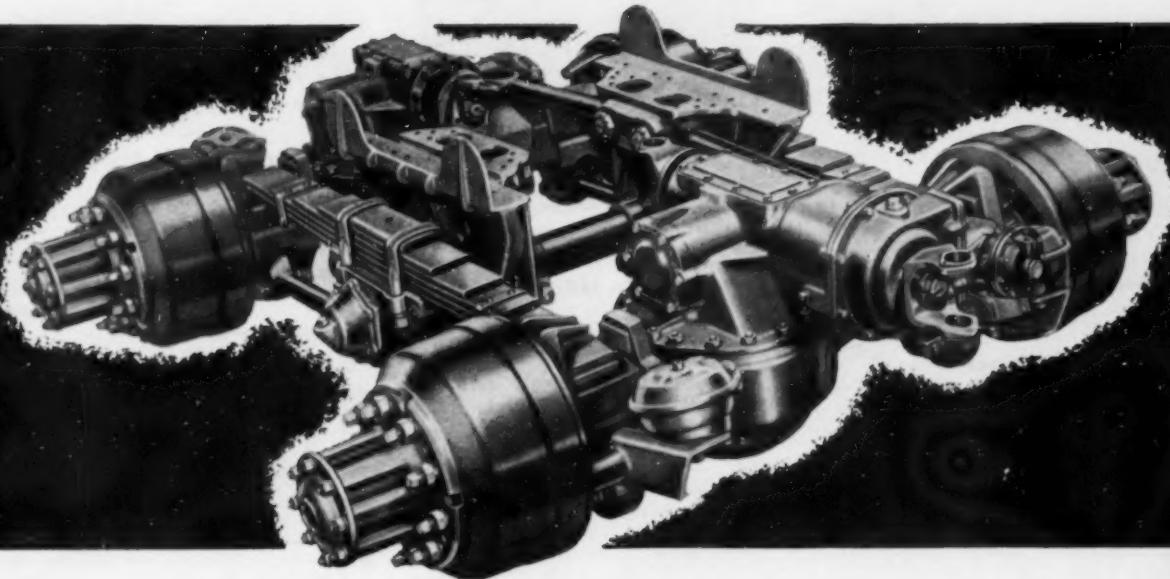
DETROIT 32, MICHIGAN



Axles and Brakes for Commercial Vehicles

Products of

Rockwell Spring and Axle Co.



Timken-Detroit Heavy-Duty Double-Reduction Tandems Give You Payload Leadership!

Ability to take the toughest going and still deliver the load on time has helped make these rugged tandems the number one choice with operators of heavy-duty vehicles. These tandems give you the big advantages of long trouble-free service, economical performance and utmost dependability.

Here are a few of the features developed in famous Timken-Detroit Tandem Drive Units—

"Cradle Ride" Suspension...free ends of long, resilient springs float in axle spring guide brackets. This permits axles to articulate freely, adjusting themselves to road irregularities. Floating springs cradle the vehicle, materially reducing road shock and eliminating source of vehicle flutter. "Cradle Ride" suspension

stabilizes the load, permits easy, restful driving . . . improves driver control and safety. Driving and braking forces are transmitted only through torque rods.

Hypoid Gears with their larger pinions and greater tooth contact give you outstanding performance, top efficiency and long life — plus lower maintenance costs.

Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to turn faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work. Driving parts and tires last longer. Controlled from the cab, differential can be locked out at any speed to give positive through drive.

Rectangular Shaped Axle Housings are forged from high carbon steel. This

rectangular shape, combined with full strength corner sections, provides the greatest strength possible with minimum weight and size.

Famous Torsion Flow Axle Shafts are made even stronger through the use of more splines and greater root and body diameter.

Dependable Heavy Duty "P" Series Air Brakes with unit-mounted design make a compact self-contained assembly. Temperatures are lower and liner life is longer because of open type spiders. Tapered "Econo-liners" provide greatest thickness in area of greatest wear.

Unequalled parts interchangeability gives you more time on the road—reduces parts inventory—speeds service. Parts are standard items readily available.

... for more details circle 333 on enclosed return postal card

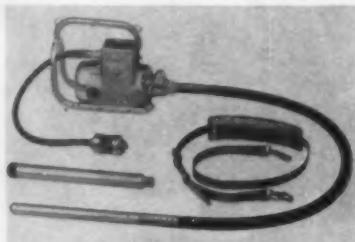
WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

New Products

(Continued from page 129)

Concrete Vibrator

An all new Viber internal concrete vibrator, trade named "Vibrette," is designed for pre-stress, laboratory and building construction. It features a $\frac{1}{4}$ hp motor of latest design plus new lightweight, small diameter flexible drives with smooth outer surface and double reinforcement internally. Drives may be had in lengths from 1 ft. to 20 ft.



"Vibrette"

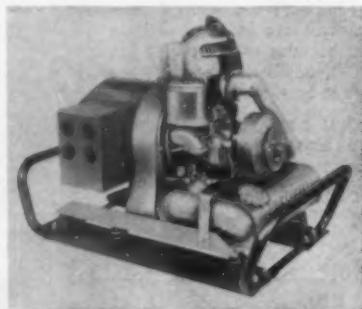
High speed, low amplitude, small diameter heads, 1 in. and $1\frac{1}{16}$ in. are interchangeable. The $1\frac{1}{16}$ in. diameter head features Viber patented rubber tip.

Viber Co., 726 South Flower St., Burbank, Calif.

For more details circle 142 on Enclosed Return Postal Card.

3000-Watt Portable Generator

Two 3,000-watt, gasoline-engine-driven generators are announced by Homelite. The new units, the 115-volt, 60-cycle Model 8A115 and the 115/230 volt, 60-cycle Model 8A115/230, provide dependable power for drills, saws, vibrators, floodlights and other construction equipment. Both generators feature 4 percent voltage regulation and a generous overload capacity. The engine is a Homelite 2-cycle directly coupled to the armature shaft. Quick maintenance service on both engine



Model 8A Homelite Generator

and generator is available from the manufacturer.

Homelite, Port Chester, N. Y.

For more details circle 143 on Enclosed Return Postal Card.



Model D-516 113-hp Diesel Power Unit

Diesel Power Units

Two new diesel power units, added to the Allis-Chalmers engine line, have been designed to serve a wide range of power requirements in the construction and oil fields, for irrigation and crusher plants, and for other fields where heavy-duty general utility power units are required. The units are the 4-cylinder, 88 hp Model D-344 and the 6-cylinder, 113 hp Model D-516.

These new high-torque engines provide a steady hp output at working speeds from 1000 to 1800 rpm. Full pressure lubrication and thermostatically controlled cooling systems are noted as providing smoother, safer operation and longer engine life.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

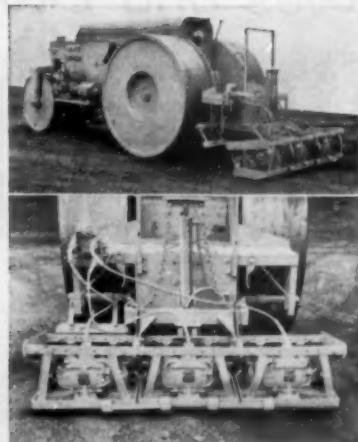
For more details circle 144 on Enclosed Return Postal Card.

Roller and Compactor

A compaction machine which provides both static and dynamic compaction effort has been announced by Galion Iron Works. It is a combination of the Galion "Chief" or "Warrior" "Roll-O-Matic" 9-wheel roller with a Jackson electric vibratory compactor.

This two-in-one machine provides, simultaneously, the compressing action of roller weight plus the consolidating action of vibration produced by 4200 three-ton blows per minute. It is claimed that the compactive effort is so effective that the most rigid Federal and State density specifications (including Proctor, Modified Proctor and AASHO-T99-49) are often attained in one pass per lift.

The compactor workhead is made up of three 26-in. wide steel plate shoes, individually vibrated by heavy-duty electric motors. The vibratory compactor is connected to the rear of the roller, and is raised for traveling or use



Combination Roller and Compactor

of the roller alone, by hydraulic power controlled from the operator's platform.

The Galion Iron Works and Mfg. Co., Galion, O.

For more details circle 145 on Enclosed Return Postal Card.

Explosives Tamers

New lightweight tamping poles, claimed to permit faster tamping of explosives in both horizontal and vertical blast holes, are constructed of aluminum pipe and weigh less than half as much as ordinary wooden poles. They are non-sparking and completely safe for all applications. The poles are offered with $1\frac{1}{2}$, $4\frac{1}{2}$ or 5-in. diameter rubber heads. Lengths of 4 to 20 ft. are available.

Austin Powder Co., Cleveland 13, Ohio.

For more details circle 146 on Enclosed Return Postal Card.

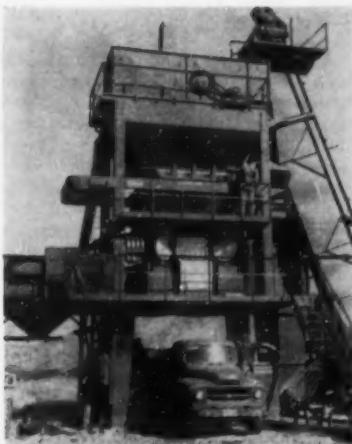
Bituminous Plant

The new Pioneer "Ante-Batch" bituminous plant has fully automatic controls with interlocking time to provide up to 15 percent greater output.

Quick-acting twin gates the full length of the pugmill discharge the batch in as little as 3 seconds. The plant can be switched to semi-automatic or manual control, without modifying or disturbing the fully automatic features.

Two pre-determined mix formulas can be set up at one time, and the plant switched from one mix to the other as desired. The aggregate heating and moisture removed unit (drier) has the dust collector mounted together with the drier on the same frame and chassis.

Rated at 6,000 to 7,500 lb. per batch, the plant has a 5 x 12 ft. vibrating screen situated over a 4-compartment hot bin of 30 tons capacity, divided 6-6 and 12 tons. A vertical mineral filler system with gravity feed has a



"Auto-Batch" Bituminous Plant

capacity of 60 cu. yd. per hour. The 85-cu. ft. aggregates weigh hopper and 1000-lb. asphalt bucket are suspended on Howe scales graduated in 5-lb. and 1-lb. increments respectively.

The total weight of the tower unit, including hot elevator is approximately 88,000 lb. Weight of the drier-dust collector unit, with fines return covered convey is approximately 70,000 lb.

Pioneer Engineering Division of Boor & Co., Minneapolis 14, Minn.

For more details circle 147 on Enclosed Return Postal Card.

Fork Lift Truck

A new Pettibone heavy duty fork lift truck, the "Super 30 Cary-Lift," has a working capacity of 30,000 lb. at all working speeds. Outstanding features include forks that can be hydraulically extended 4 ft. forward at any mast height, and forks that lift independently of the mast. Maximum tilt-up is 15 degrees; maximum down-tilt is 73 degrees.

Pettibone Mulliken Corporation, 4710 West Division St., Chicago 51, Ill.

For more details circle 148 on Enclosed Return Postal Card.



"Super 30 Cary-Lift"

HUBER-WARCO

motor graders



only \$5 a month on parts

Lothridge Brothers Construction Company of Gainesville, Ga., have given their Huber-Warco 5D-190 a good workout, during the past year and a half, in the rugged mountainous region of north Georgia. During that time, replacement parts have averaged only \$5 a month. "When we bought the 5D-190 we bought less than \$100 worth of replacement parts," said Ray Lothridge, "and to date only a few of these parts have been used." A performance like this is not uncommon among other 5D-190 owners. The Huber-Warco 5D-190, with torque converter, has been designed to handle big volume grading efficiently and economically. Your Huber-Warco distributor can give you complete details . . . contact him today.



MAINTAINER



MOTOR GRADERS



TANDEM ROLLERS



3-WHEEL ROLLERS

Products of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

Send specifications on the Huber-Warco

5D-190 other motor graders

Send specifications on: Maintainer

Tandem Rollers 3-Wheel Rollers

Name _____

Title _____

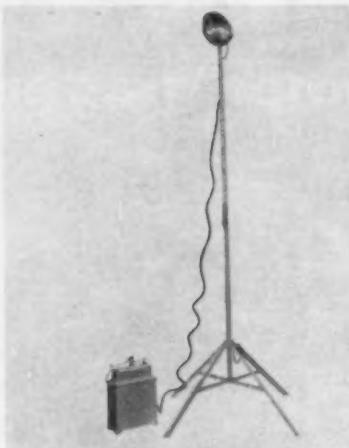
Company _____

Address _____

City _____ Zone _____ State _____

4-RS





Escolite Utility Light

Utility Light

A new utility light has been added to the Escolite electric flasher warning lights. This rugged, shockproof light can be used in all types of weather. Has rustproof, heavy die cast head; water-proof phosphatized neoprene sealed case; double battery that gives more battery life, yet draws less battery current. Available lens colors are red, amber and clear. Head sizes are 7 in. and 4 in.

Electronic Specialties Corporation, Batavia, Ill.

For more details circle 149 on Enclosed Return Postal Card.



Air Reduction's New Welding Unit

Welding Equipment

A new manual unit for the application of its "Aircomatic" or inert-gas shielded arc-welding process has been introduced by Air Reduction Sales Co. The assembly provides a completely new type of wire feeding system to handle the broadest range of wire types

and sizes from the finest to the heaviest.

Air Reduction Sales Co., a division of Air Reduction Co., Inc., 150 East 42nd St., New York 17, N.Y.

For more details circle 150 on Enclosed Return Postal Card.

Improved Agitator

The new 4-yd. "Agitor" incorporates a number of changes. The transmission drive has been moved to the front wall with adjustable chain centers for chain take-up. The hydraulic tank is now located between the frame rails, and the agitator has been extended to the gate, which creates faster discharge of low slump concrete.

Agitation differs from that of the conventional truck mixer by moving through the concrete, keeping the load consistent and preventing segregation.



S & M "Agitor" Discharge

The "Agitor" controls discharge by elevating the body, opening the gate, and rotating the agitator. It also features a high discharge point, power operated gate and chutes, and fast charging and discharging.

S & M. Manufacturing Co., Inc., 2901 West Mill Road, Milwaukee 9, Wis.

For more details circle 151 on Enclosed Return Postal Card.

Sweeper Broom Cores

Rotary broom cores, core replacements, and core repairs for sweepers (Littleford, Meili-Blumberg, Detroit-Harvester, Lull, Fordson, Hough, Rosco, Huber, Grace, Spearwell, and others) are announced under the name "Big D". Cores are furnished either with or without any filling or cable, or complete with Hickory, Palmyra stalks, Calibar brass fibers or Spring steel wires. Speedy service is featured.

Dallas Brush Manufacturing Co., 2054 Irving Blvd., Dallas 7, Texas.

For more details circle 152 on Enclosed Return Postal Card.

3-Yd. Shovel

A new 3-yd. Model 3600 shovel has been added to the Manitowoc line. Basically a shovel, the Model 3600 is also convertible to crane, clamshell and dragline applications. It has a 3-stage torque converter coupled to a fast, rugged engine equipped with the Manitowoc "Torque-limiting tail shaft governor". There are just 14 gears in the entire machine, with the gears turning only when working to reduce power loss. This is accomplished with the exclusive Manitowoc "Powerflow" slide pinion arrangement.

Manitowoc Engineering Corp., Manitowoc, Wis.

For more details circle 153 on Enclosed Return Postal Card.



Model 3600 3-yd Shovel

Colossus on Wheels

The dump truck shown below has the largest aluminum body ever built for such a unit—capacity 37½ cu. yd. The truck is 30 ft., 3 in. long, 12 ft., 4 in. wide, 11 ft., 11 in. high, and weighs 54,000 lb. It was built by Mack Trucks for the Aluminum Company of America, who will use it in bauxite mining operations in the Dominican Republic. Load-carrying capacity is 67,000 lb. Power is by 355-hp turbocharged diesel engine.

Mack Trucks, Inc., 1355 West Front St., Plainfield, N.J.

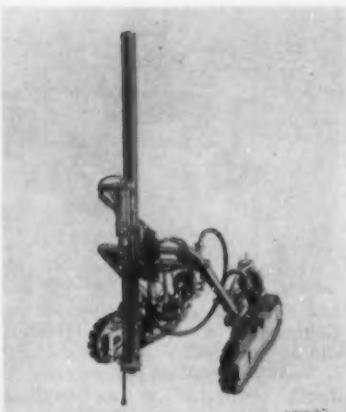
For more details circle 154 on Enclosed Return Postal Card.



Aluminum Body on Mack Truck

HUBER-WARCO

motor graders



LWD-400 Rock Cruiser

A Drill for Rough Spots

A new Le Roi air powered, trac-type drill rig is designed for hard rock drilling in rough terrain. A special U-base construction and large-size air motors are stated to make this LWD-400 "Rock Cruiser" ideal for heavy drilling in hard-to-get-at places.

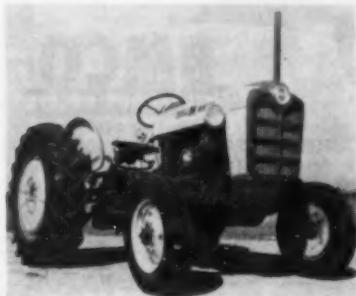
Carriage features include the proven U-Bar design, two large air motors, automatic brakes, a geared final drive, spring loaded track takeups, built-in line oiler, and life-time lubrication. The U-Bar construction provides drilling flexibility through a 105 degree vertical boom arc. The drill feed can be placed flat on the ground for toe hole drilling.

LeRoi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

For more details circle 155 on
Enclosed Return Postal Card.

Diesel Engine Tractors

A new line of diesel powered tractors, announced by Ford Motor Co., will carry suggested retail prices only \$395 above gasoline tractor prices. All equipment in the Ford line will fit the diesel tractors without modification.



Ford Diesel Engine Tractor

The new diesel engine has a displacement of 172 cu. in., delivering 35 hp at the drawbar. Normal starting is provided by a 12-volt electrical starter, without recourse to a special starting engine or supplemental fuel. In extreme cold weather, optional manifold



bank sloping made easy

Exclusive with Huber-Warco MOTOR GRADERS is the complete hydraulic cab-controlled blade movement. In less than a minute, and without ever leaving the cab, the operator can move the blade from a 90° bank sloping position on one side to 90° on the other. There are NO manual adjustments to be made. This bonus feature is on all Huber-Warco torque converter and standard transmission MOTOR GRADERS ranging in horsepower from 75 to 195 h.p. Get all the important facts . . . contact your Huber-Warco distributor today.



MAINTAINER



MOTOR GRADERS



TANDEM ROLLERS



3-WHEEL ROLLERS

Products of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

Send specifications on Huber-Warco
motor graders.

Send specifications on: Maintainer
 Tandem Roller 3-Wheel Roller

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

4-RD



pre-heaters or an ether cell may be used as a starting aid.

Tractor and Implement Division,
Ford Motor Co., Birmingham, Mich.

For more details circle 156 on
Enclosed Return Postal Card.



GMC "Wide-Side" Pickup Truck

Pickup Truck

A new GMC "Wide-Side" pickup truck is stated to have 50 percent greater cubic load space than conventional bodies. The body encloses the wheel walls, and comes in either 6½ or 8 ft. lengths. The 6½ ft. box holds 59.5 cu. ft.; the 8-ft. 7½ cu. ft.

The extra capacity has been achieved with only a 4-lb. increase of weight in the smaller box and 22-lb. in the 8 ft. version.

GMC Truck & Coach Division, General Motors Corporation, 660 South Boulevard East, Pontiac 11, Michigan.

For more details circle 157 on
Enclosed Return Postal Card.

Oil Filtration

The advantages of full-flow oil filtration have been added to the industrial and marine arrangements of two Caterpillar Series D diesel engines. The D375 (Series D) and D397 (Series D) are now being supplied with three and four pleated, impregnated paper elements respectively, which will give complete filtration to the total volume of lubricating oil in the engines. This engine-mounted system replaces the bypass method formerly used.

The increased filter capacity of the system and the improved efficiency of the paper elements, which trap even the smallest dirt particles, permit extended oil filter change periods. For engines presently operating, oil filter changeover groups are available for field installation.

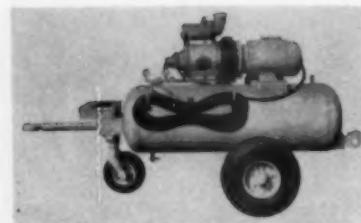
Caterpillar Tractor Co., Peoria, Ill.

For more details circle 158 on
Enclosed Return Postal Card.

16 CFM Air Compressor

A new Davey electric motor driven portable compressor, Model MB-2, is capable of delivering 16 cfm at 200 psi.

The compressor is mounted on a



Davey Model MB-2

wheels, with a retractable 3rd wheel and can be easily moved by one man. Compressor is a Davey Hydrovane sliding vane rotary unit, oil cooled. It is located atop the air receiver and direct connected to an explosion-proof electric motor. Air hose is located on a side rack. An extension cable can be easily plugged into the power source.

Davey Compressor Co., Kent, O.

For more details circle 159 on
Enclosed Return Postal Card.

Pick-Up Lift Gate

A hydraulically operated pick-up lift gate designed specifically for ½ and ¾-ton trucks with express-type body has been added to the Anthony lift gate line. The unit will raise or lower loads up to 800 lb. The gate comes as a single unit that can be bolted easily to the truck body in place.

BMCO SELF PROPELLED ROLLER—All wheels oscillate on this exclusive BMCO design . . . giving more perfect compaction. Overloading of any one tire is impossible because all wheels act independently.

BMCO
50 TON COMPACTOR

BMCO 50 TON COMPACTOR—Greater ballast capacity assures maximum compaction and a FULL 50 TONS, as well as giving more space for shifting ballast load to regulate drawbar pressure. Interchangeable tongue means any towing unit can be used.

... for more details circle 245 on enclosed return postal card

THE BIG THREE 'ROAD BUILDERS'

BMCO
SHEEPSFOOT ROLLER

BMCO SHEEPSFOOT ROLLER
Especially designed to tamp faster, walk out more quickly and clean better with less required drawbar pull. The frame will not pull apart. Available in single, double and triple drum models.

DAICO
BROWNING MANUFACTURING CO.

111 HUMBLE AVENUE P. O. BOX 2707
SAN ANTONIO 6, TEXAS

136

ROADS AND STREETS, April, 1958

of the original tail gate. The hydraulic lifting mechanism is driven by a small electric motor powered by the truck's battery. Loads are lowered by gravity. Connection of the gate to the battery requires only one wire.

Anthony Company, Streator, Illinois.



Anthony Pick-Up Lift Gate

For more details circle 160 on
Enclosed Return Postal Card.

Dryer Burners Control

General Construction Equipment Co. has introduced the "Gencomatic" control system for use with its "Genco" burners on aggregate dryers. Features include: automatic control of aggregate temperature, automatic ignition of the burners, full flame failure safeguards, daily continuous record of temperature.

General Combustion Equipment Co.,
P. O. Box 387, Alliance, O.

For more details circle 161 on
Enclosed Return Postal Card.

Nylon Sweeper Brooms

Du Pont's "Tynex" nylon monofilament has recently tested in mechanical sweeper brooms in several cities. To date, test brooms bristled with "Tynex" have outlasted brooms or standard vegetable fiber many times over.

The average service life of vegetable fiber brooms is reported to be approximately 150-200 sweeping miles. Test brooms using nylon filament swept about 4000 miles before rebristling was needed.

In Philadelphia, where tests began last fall, operators reported that the new nylon brooms picked up all kinds of litter from fine silt to whole bricks with ease. The brooms can also be used for snow removal.

E. I. Du Pont de Nemours & Co., Public Relations Department, Wilmington, Del.

For more details circle 162 on
Enclosed Return Postal Card.

HUBER-WARCO

tandem rollers



H-W tandem on Connecticut Turnpike

Two Huber-Warco TANDEM ROLLERS have been used by D'Addario Construction Company of Bridgeport, Connecticut, to put the finishing touch to 20,800 tons of bituminous concrete in the Fairfield-Bridgeport area of the Connecticut Turnpike. These two rollers handled the paving of bridge ramps, approaches, dividers and shoulders. D'Addario has also used the two Huber-Warco TANDEM ROLLERS in many other paving jobs in the Bridgeport area, and like the dependable performance of the units. They also own a Huber-Warco variable weight 3-WHEEL ROLLER that has recently been used for seal coating. A Huber-Warco TANDEM ROLLER can play an important part in your "profit-paving" operation. See your Huber-Warco distributor for complete details.



MOTOR GRADERS



TANDEM ROLLERS



3-WHEEL ROLLERS



MAINTAINER

Products of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

Send specifications on Huber-Warco tandem rollers.

Send specifications on: Maintainer
 Motor Graders 3-Wheel Rollers

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

4-RS





Anthony's Aluminum Dump Body

Aluminum Dump Bodies

Increases in permissible payload are cited by Anthony Company in announcing its new aluminum dump truck body and aluminum frameless dump trailer. In the 18-yard trailer, this amounts to 3060 lb. over the steel frameless unit.

Both bodies are completely welded. Alloys used are said to have excellent impact and abrasion resistance, with a strength equal to that of 10 gauge steel. Contributing to weight reduction in both units is the use of "Teleramic" hydraulic hoists and the distribution of more load to the front end.

Anthony Company, Streator, Ill.

For more details circle 163 on Enclosed Return Postal Card.

Truck Tire

A new General truck tire is claimed to give up to 10 percent greater mileage with no change in price structure. Named the "Traction Rib Special Service," it has a wider, deeper tread than the "Highway" tire which it supersedes, while the tire body is of the same standard construction.

The General Tire & Rubber Co., Akron, O.

For more details circle 164 on Enclosed Return Postal Card.



"Euc" 18-yr Model R-27

27-Ton Rear Dump

A new size rear dump, with 27-ton payload rating, is announced by Euclid Division of General Motors. Known as Model R-27, this "Euc" is equipped with either 300-hp Detroit Diesel or 335-hp Cummins engine. Allison "Torqmatic" drive and 18.00 x 25 tires on all wheels. Top loaded speed is 34 mph.

Both the standard and optional quarry type body are 18 cu. yd. struck capacity. Designed to work with big loading equipment, the R-27 has a loading height of 9 ft 10 1/2 in and a dumping angle of 61 degrees.

Euclid Division, General Motors Corp., Cleveland 17, Ohio.

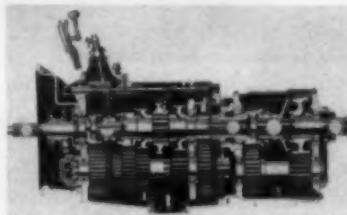
For more details circle 165 on Enclosed Return Postal Card.

9-Speed Transmission

A new Fuller heavy-duty semi-automatic transmission is designed specifically for big earthmoving and mining equipment.

Called the R-1550 "Roadranger transmission," the new model is rated for engines up to 1550 cu. in. displacement producing up to 600 hp. It features nine forward ratios, with direct drive in eighth gear, and two reverse ratios—all controlled with one gear shift lever. Gear shift steps are short and even, averaging 38 percent between ratios.

Fuller Manufacturing Co., Transmission Division, Kalamazoo, Mich., U.S.A.

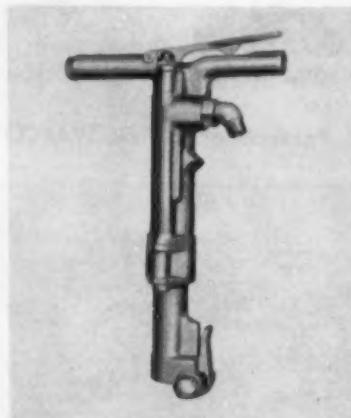


R-1550 "Roadranger" Transmission

For more details circle 166 on Enclosed Return Postal Card.

Lightweight Breaker

A new Le-Roi lightweight breaker, the LB35, featuring a new latch type steel retainer and a simplified swivel "O" ring air connection, is designed for durability and low maintenance in the 35-lb class.



LB 35 Breaker

Available as a breaker, with a clay spade handle, or a trench digger handle, the LB35 is well balanced and its "air cushioned" hammer action makes it easy to hold and operate. It is stated to be especially suited for light demolition work, horizontal breaking, digging trenches, breaking frozen ground, or trimming.

LeRoi Division Westinghouse Air Brake Co., Milwaukee 1, Wis.

For more details circle 167 on Enclosed Return Postal Card.

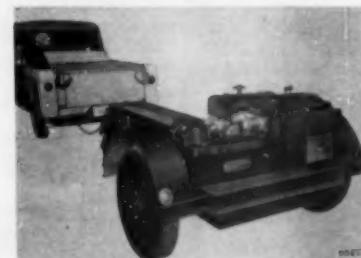
Mobile Track Pin Press

A new trailer-mounted "Trackmaster" hydraulic track pin press, incorporating all of the features of the stationary model, announced by Owatonna Tool Co., enables contractors to make emergency repairs on even complete track overhauls at the breakdown site in the field.

Like standard "Trackmasters", this trailer unit uses a 125-ton ram to push both pin and bushing simultaneously, without broaching, shearing or otherwise damaging sidelinks. Complete overhaul can be done with grousers on (two bolts removed) or off.

Owatonna Tool Co., 474 Cedar St., Owatonna, Minn.

For more details circle 168 on Enclosed Return Postal Card.



Trackmaster Model YT 7000

Abrasive Resistant Gloves

A new "Koroseal"-coated canvas glove, especially designed for handling abrasive materials such as concrete rubble or broken brick in brick yards, tile plants, stone quarries and construction work of all types, is announced by B. F. Goodrich. The coating not only resists abrasion but protects against acids, caustics, petroleum and mineral oils. The new gloves are available in three styles: knit wrist, safety wrist and gauntlet.

B. F. Goodrich Industrial Products Company, Akron, Ohio.

For more details circle 169 on Enclosed Return Postal Card.

Manufacturers' Literature

SYLVANIA ELECTRIC SYSTEMS FOR NATIONAL DEFENSE is the title of a 32-page, three-color brochure now available from Sylvania Electric Products Inc., 100 First St., Waltham, Mass. It outlines the company's capabilities in the fields of electronic warfare systems, defensive missile systems, intelligence and reconnaissance systems, data processing systems, and related subsystems and equipment in communications, navigational aids, radar, countermeasures, and computers. There is a liberal selection of photographs and sketches.

For more details circle 170 on Enclosed Return Postal Card.

BRONZE CENTRIFUGAL CASTINGS. A well-illustrated, comprehensive discussion of the advantages of centrifugal casting of bronze and copper parts for a wide range of applications. Booklet includes description of the technique, a complete chart showing all alloys available with their specific characteristics, illustrations of typical castings, NBD facilities and engineering services. Write Dept. A, American Brake Shoe Company, 530 Fifth Avenue, New York 36, N.Y.

For more details circle 171 on Enclosed Return Postal Card.

CARE OF WIRE ROPE, an informative bulletin on "Storage and Lubrication of Wire Rope" has been announced by Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Mo. The proper procedures to follow when either new or used wire rope is to be stored are described in detail, as are the various steps to take when the rope is put back into service. The need for proper lubrication is also discussed. Ask for Red-Strand Wire Rope Service Bulletin No. 103.

For more details circle 172 on Enclosed Return Postal Card.

THEW SHOVEL FILM. A new 16-mm., sound, color film entitled "Run Crane, Run" is announced by The Thew Shovel Co., Lorain, Ohio. Running time—25 minutes. The film highlights design and operating features of the newest Lorain shovel-crane, the 7-ton, $\frac{3}{8}$ -yd., self-propelled Lorain SP-106, a rubber tired, convertible shovel, crane, dragline, clamshell or hoe.

For more details circle 173 on Enclosed Return Postal Card.

BITUMINOUS MAINTENANCE DISTRIBUTOR. Rosco Manufacturing Co., 3118 Snelling Ave., Minneapolis 6, Minn., has issued Bulletin 566-B showing how the distribution featuring uniform coverage mounts and operates on a standard track. Complete specifications are included. Two models of the maintenance distributor are shown as they will appear when actually mounted—the 1,000-gal. RHU and the 800-gal. RHU.

For more details circle 174 on Enclosed Return Postal Card.

POWER CRANE AND SHOVEL ASSOCIATION, 75 West St., New York 6, N.Y., has developed a series of technical bulletins and literature covering the operation and maintenance of excavating equipment. Subjects currently available include: The functional design and job applications of power cranes and shovels—an academic approach to the subject and of particular value to students. An operating cost guide for the purpose of estimating cost of ownership and operation of power shovels, drag-lines, clamshells and cranes including information on the proper sizing of excavators and hauling equipment and on front-end attachments and their operation. Power crane applications in industrial plants and storage yards and a graphically illustrated operator's manual known as "125 Ways to Better Power Shovel-Crane Operation".

For more details circle 175 on Enclosed Return Postal Card.

USED EQUIPMENT. Particulars of Caterpillar dealer's bonded used equipment values under three guarantees are included in an 8-page booklet, "For Used Equipment You Can Trust," recently released by Caterpillar Tractor Co. The brochure outlines what Caterpillar Dealers can offer on used equipment with "Bonded Buy", "Certified Buy", and "Buy and Try" programs. Copies may be obtained at any Caterpillar Dealer's showroom or by writing to Advertising Division, Caterpillar Tractor Co., Peoria, Ill., and requesting Form 32813.

For more details circle 176 on Enclosed Return Postal Card.

CONCRETE TESTING MACHINES. Soil-test, Inc., 4711 W. North Ave., Chicago 39, Ill., has issued a 6-page bulletin on portable and laboratory type machines for testing concrete cylinders, blocks, beams and similar construction materials. Capacity range is from 200,000 to 400,000 lb. Accessory equipment is covered.

For more details circle 177 on Enclosed Return Postal Card.

WAGON DRILLS. Ingersoll-Rand's new flier, Form 4191, describes the company's three models of wagon drills—the FM-4 for tough, sustained work on

road building, general construction, foundation and quarry jobs—the FM-4 Rotary for fast drilling with "fishtail" bits in soft formations where percussion drilling isn't practical—the JHM "Wagonjack" for locations where weight is a problem. The flier also lists drill accessories. Copies available at any Ingersoll-Rand branch or from Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

For more details circle 178 on Enclosed Return Postal Card.

VEGETATION CONTROL WITH CHEMICAL KILLERS is treated in an 8-page brochure just issued by The Dow Chemical Co., Midland, Mich. Solutions are listed for the treatment of seven different weed, grass, and brush problems, and suggestions and descriptions are given.

For more details circle 179 on Enclosed Return Postal Card.

THRIFTLINE bituminous distributor recently introduced to the industry by Municipal Supply Co., is fully described, with two-color illustrations in Catalog T-100. Figures showing performance of the budget-priced model are given. A large, special cutaway illustration highlights sixteen special features. Drawings show how the simplified distributing system works. A complete list of dimensions, weights, standard and extra equipment is included. Copies of the catalog are available from Municipal Supply Co., Dept. T-20, 2508 S. Main St., South Bend 23, Ind.

For more details circle 180 on Enclosed Return Postal Card.

EQUIPMENT AND ACCESSORIES which increase the versatility of Allis-Chalmers motor scrapers, motor wagons and pull-type scrapers and promote higher production and provide added operator comfort and safety are covered in a new 4-page piece MS-1270—now available from the company's Construction Machinery Division in Milwaukee, Wis.

For more details circle 181 on Enclosed Return Postal Card.

BID-BEATING, DIRT HEAVING, a new 12-page catalog, Form CR-638-H, available from International Harvester Co., Construction Equipment Division, 180 N. Michigan Ave., Chicago 1, Ill., details "Payscraper" operation and specifications. New catalog depicts operations of the Model 55 and 75 Payscrapers on construction projects.

For more details circle 182 on Enclosed Return Postal Card.

(Continued on page 142)



"A-W Super 99 is the best machine on the market"

says **Leo Russell, Russell Industries, Inc.**

Russell Industries, Inc., Presto, Pa., asphalting contractor, specializes in building roads and parking lots. The company added another Austin-Western grader, a Super 99, to the team in June 1957—has three A-W graders now.

Leo Russell informs us: "We compared the new A-W Super 99

with other competitive graders and believe that it is the best machine on the market. It is excellent for leveling slag, does a faster job, and is easy to maintain. The all-wheel drive is an outstanding feature, and we also like the way you can grade curves without backtracking. Another thing that is very important is the

fine service we get from our local A-W distributor. We've always been able to get good delivery on any parts we've needed."

Operator William H. Westfall says: "I've been operating graders for almost 30 years and consider the A-W Super 99 far superior to any other make. It's extremely maneu-



A-W Super 99 Grader, owned by Russell Industries, Inc., shown spreading slag on parking lot project in Irwin, Pa. William H. Westfall is the operator.

verable, and no other grader can match the traction you get with all-wheel drive. The A-W will do any job any other grader will do and do it quicker, besides being a lot easier on the operator. Hydraulic controls let you do a more precise job than

mechanical controls, and you don't get the 'kicking' that tires you out. With the torque converter and standard transmission, you have perfect control downgrade as well as up. Another reason why I like the A-W is the way you can go from grading

to back sloping or ditching without leaving your seat and making special adjustments."

Find out for yourself why the men who know graders best put their money on Austin-Western. Write for free illustrated booklet.

Austin-Western

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

... for more details circle 236 on enclosed return postal card
ROADS AND STREETS, April, 1958



Manufacturers' Literature

(Continued from page 139)

JOB TESTED FOR JOB EFFICIENCY. An 8-page booklet, Form D746, published by Caterpillar Tractor Co., Peoria, Ill., illustrates with photos and job stories, the wide range of applications in which Cat D7, D8, and D9 tractors are used.

For more details circle 183 on Enclosed Return Postal Card.

PSI CALCULATOR. A slide calculator for converting gauge pressures to pounds per square inch is issued by Forney's Incorporated, P.O. Box 310, Newcastle, Pa., makers of compression and flexure testers for concrete cylinders, cubes, blocks, beams, and pipe, and other concrete testing equipment.

For more details circle 184 on Enclosed Return Postal Card.

FLASHER LIGHT AND BARRICADES. R. D. Fageol Co., Kent, O., has issued a new 4-page catalog, LL6807, containing illustration, line sketches, complete descriptions and specific items of its flashes safety light line of battery-powered hazard warning lights, batteries, accessories and barricades.

For more details circle 185 on Enclosed Return Postal Card.

INTERNATIONAL HARVESTER CO. 180 North Michigan Ave., Chicago 1, Ill., has released a 16-page booklet, Form CR-635-H, describing the International TD-14 crawler tractor equipped with the "4-in-1" Drott skin shovel. This highly versatile piece of equipment, which can be operated as a bulldozer, bullclam, skid shovel or clam shell by a single simple movement, is explained in detail. Also featured are nine attachments that can be used with this unit.

For more details circle 186 on Enclosed Return Postal Card.

CORE DRILL. Acker Drill Co., Inc., P. O. Box 830, Scranton, Pa., has issued a new bulletin, No. 29, on its Hillbilly core drill. Features of the drill are illustrated and described, and information is given on its use. Specifications are included.

For more details circle 187 on Enclosed Return Postal Card.

MECHANICAL POWER TRANSMISSION EQUIPMENT. Worthington Corporation has issued a 16-page catalog, Bulletin 7900-B & P, to aid product design engi-

neers. The catalog contains selection charts for heavy duty Q D sheaves; light weight and QD Junior sheaves; Worthington-Goodyear V-belts; and variable speed drives, which include allspeed drives, motor drives, and motor pulleys. Copies are available from Advertising and Sales Promotion Department, Worthington Corporation, Harrison, N.J.

For more details circle 188 on Enclosed Return Postal Card.

TRAFFIC LINE MARKERS. M-B Corporation, New Holstein, Wis., has issued new literature describing its models 6-18 and Super 10 line markers. Performance features and detailed specifications are given.

For more details circle 189 on Enclosed Return Postal Card.

FLOODLIGHTS. The Pyle-National Co., 1334 North Kostner Ave., Chicago 31, Ill., has issued an 18-page bulletin, No. 640, on its new line of mercury vapor floodlights of the heavy duty type. It contains the latest information on the operating characteristics and operating economies as well as the color characteristics of all the currently available mercury vapor lamps. In addition, there is a section on how to select ballasts with illustrations of the typical ballast types and mountings.

For more details circle 190 on Enclosed Return Postal Card.

A. C. PAINT STRIPING SUPPLIES CO. RR 2, Box 64-E, Bensenville, Ill., has issued a 4-page circular, illustrating and describing its striping machine. Included are directions for planning and marking a parking lot.

For more details circle 191 on Enclosed Return Postal Card.

STRESSTEEL CORPORATION. 221 Conynham Ave., Wilkes-Barre, Pa., has issued a new manual, SS-3, describing Stressteel materials for post-tensioned, prestressed concrete applications. Engineering data, specifications and procedures are included.

For more details circle 192 on Enclosed Return Postal Card.

WIRE ROPE. A 4-page folder, Bulletin No. 102, available from Advertising Department, Leschen Wire Rope Division, H. K. Porter Co., Inc., 2727 Hamilton Ave., St. Louis, Mo., deals with crushing as a common hazard to wire rope. All the major causes of crushing are described, and many suggestions are given for recognizing this source of wire rope troubles, and for lessening or eliminating them altogether.

For more details circle 193 on Enclosed Return Postal Card.

MOTOR GRADER. The Galion Iron Works & Mfg. Co., Galion, Ohio, has published a 4-page bulletin, No. 421, on its Model 16 Motor Grader. The heavy-duty, constant-mesh, six-speed transmission of this 160-hp grader, as well as operating and construction features, are fully described and illustrated. Complete specifications are included.

For more details circle 194 on Enclosed Return Postal Card.

ATLAS COPCO EASTERN, INC. 151 Linwood Ave., Paterson, N.J., has announced three new product folders and leaflets. Leaflet E-1106 describes the firm's BMK automatic pushed legs for rock drills. Leaflet E-1097 describes the new "Terrier" rock drill, Type BBD-12-WH. Folder E-568 discusses carbide inserts now incorporated in Sandvik coromant integral drill steels.

For more details circle 195 on Enclosed Return Postal Card.

STREET LIGHTING LUMINAIRES. Two new bulletins describing street lighting luminaires are now available from Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wisconsin. Both bulletins utilize a new L-M system of identification, designating all fluorescent luminaires "Line 1" and all incandescent luminaires "Line 3".

Bulletin SL1 provides complete descriptions, photometric data, catalog numbers, and prices on "Line 3" incandescent luminaires. Listings according to IES distribution patterns simplifies selection.

"Line 1" fluorescent luminaires are described and illustrated in Bulletin SL6. This includes application and ordering information on deep-globe, shallow-globe, floodlight, delta, and vee fluorescent units.

For more details circle 196 on Enclosed Return Postal Card.

COMPUTER FOR ENGINEERS. Bendix Computer Division, 5630 Arbor Vitae St., Los Angeles 15, Calif., has issued a new, illustrated bulletin on the Bendix G-15 general purpose digital computer. Featured is a full description of the simplified programming of this low-cost machine, which places it among the easiest computers to use. Engineers can be taught coding techniques within 2 to 4 hours. Specifications, accessory equipment and applications are also described in the bulletin.

For more details circle 197 on Enclosed Return Postal Card.

(Continued on page 146)

Standard Beam Guard Rail

Solves Median Problem

THE DIVIDED highway, while a great step forward in safety, does not entirely prevent head-on collisions. Actually, as pointed out by an engineer with Bethlehem Steel Co., a hazard still exists in spite of traffic lane separation. Instances are frequent where vehicles have gone out of control and crossed the median strip to collide with another vehicle, with catastrophic consequences. This has been particularly the case where restricted right-of-way has prevented building median strips wide enough to be parked, depressed, elevated, or otherwise arranged so that even should a vehicle leave the pavement it could not enter the opposing traffic lane.

A successful means of separating traffic has been the installation of rolled steel beam guard rail, such as that manufactured by Bethlehem Steel Co.

To be effective, such a guard rail must be visible to drivers in any weather and not only resist the impact of any vehicle running out of control, but deflect the vehicle to a course parallel with the rail with

minimum damage and the least possible harm to its occupants or cargo.

Steel beam guard rail when properly installed on 6-in. I-beam type steel posts, is amply strong to withstand the most severe shocks. The rolled curvilinear construction provides maximum resilience. It has a standard minimum depth of 3 in. and a minimum width of 12 in. and is regularly supplied in 12½ ft. lengths to fit the specified distance between posts. It can be had in either 12 or 10 gauge depending upon the situation and need. In areas of heavy traffic density, especially where commercial vehicles are numerous, the heavier 10 gauge beam provides an extra measure of protection.

When used as a traffic divider, the guard rail is installed back to back on the posts. Ends are protected by a special rolled fitting.

In addition to eliminating head-on collisions, beam guard rail is now being used to protect light, signal and directional standards along major highways, thus reducing the "mortality" among these installations.



● Close-up shows the construction of Bethlehem safety-beam guard rail, when installed back to back as high-speed highway median strip safety divider, utilizing 6-in. steel I-beam type posts.

Operators' School Held At Texas A. & M. College

A heavy construction equipment operators school recently has been conducted on the grounds of the Texas A. & M. College, College Station, Texas. Put on by the Engineering Extension Service of the College, and sponsored by the Associated General Contractors, Texas Highway branch, the school is said to be unique in several respects. It marks a "first" in such a school operated by a public institution of higher learning. Heavy equipment manufacturers and distributors, as well as contractors, have supported the activity with various kinds of aid.

There were 14 students in the first class, which had the benefit of a wide range of equipment valued at more than \$½ million supplied by leading manufacturers.

A. L. Kramer was coordinator of the course, under Dr. John C. Calhoun, Director of Engineering Extension Service, and H. D. Bearden, Vice-Director.



● Bethlehem beam guard rail installed between traffic lanes for prevention of head-on-collisions between vehicles traveling the new Patapsco tunnel approaches near Baltimore.

Culvert Association Elects

G. F. Beall of Portland, Ore., has been elected to the Board of Trustees of the Toncan Culvert Manufacturers Association, with headquarters at Cleveland. Also elected are J. M. Wood of Memphis, Tenn., and W. J. Sweeney of Groton, N.Y.

Hubert Snyder continues as Managing Director and ex-officio board member.

Now! The greatest concentration built into a truck engine!

Ford's all-new Super Duty V-8's—with displacements of 401, 477 and 534 cubic inches—are designed to handle GVW's up to 51,000 lb. and GCW's up to 75,000 lb. on America's toughest runs. And their endurance has been proved, not only in dynamometer labs and on the proving grounds, but in commercial fleets from coast to coast.

You get more miles with less downtime! These all-truck engines combine an entirely new concept of engine cooling with the latest developments in mechanical design and materials, setting new Ford standards of performance and dependability in heavy-duty truck service. Here is the "how and why" of Ford's superiority:

Exclusive three-stage cooling provides fast, uniform warm-up. Coolant flow is controlled by a second thermostat that balances the rate of warm-up and expansion of block and heads. Stress concentrations and the possibility of head warpage are virtually eliminated.

High-capacity water pump, the heart of Ford's cooling system, circulates over 200 gallons per minute. High volume coolant flow, with little or no aeration, supplies vital scrubbing action at valve guides and seats. Another advantage of this unique pump—its high capacity (50% more than competitive types) is obtained with no increase in required horsepower.

Water-jacketed fuel-air intake passages, in manifold and heads, maintain correct and uniform fuel temperatures from carburetor to combustion chambers. This results in proper va-

porization and equal distribution of fuel-air mixture to each cylinder for improved economy and maximum engine smoothness.

New "In Block" combustion chambers transfer heat concentration from heads to block for 360° chamber cooling. This transfer allows better cooling of head and valve areas, greatly increasing the life of these parts. Combustion heat absorbed by the head of the aluminum alloy piston is transferred to the long, solid piston skirt. From there it is readily dissipated through the cylinder wall into the coolant which surrounds cylinder throughout the entire length of piston travel. The result is long life pistons and rings.

Internally mounted oil cooler keeps oil at lower temperatures for better lubrication. Reduced oil temperatures maintain greater oil film strength and

reduce oil carbonization. Also, cooler oil means cooler running, longer lasting rod, main and camshaft bearings.

Fully machined combustion chambers mean close tolerances for accurate regulation of compression pressures. In Ford's new Super Duty V-8's, all surfaces of the combustion chamber (cylinder wall, bottom of head and top of piston) are precision-machined. Piston tops have a tapered step to maximize turbulence for improved combustion with regular grade gasoline. The smooth, straight surfaces of this wedge-shaped combustion chamber eliminate deposit-forming pockets to minimize harmful preignition.

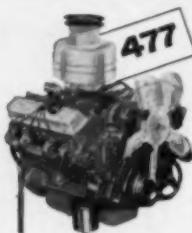
Turbulence Top pistons have four rings and three of them, including the oil ring, are chrome-faced for long life. The top ring groove has a bonded cast-iron insert to further reduce wear. Piston tops are extra thick to withstand high compression pressures. Each piston contains thermal struts that control expansion for a precise fit, hot or cold.

Hard-faced intake and exhaust valves with wear-resistant valve seat inserts are a Ford exclusive. Valves are made of heat-resistant materials and heads are dish-shaped to allow them to seat readily. To minimize the possibility of sticking, valve stems are electrolyzed, a surface treatment previously restricted to aircraft engines. Positive rotators provide a self-cleaning action for

NOW!
Three all-new
all-truck
V-8's



277-hp Short Stroke V-8 . . .
Torque: 490 lbs-ft @ 1800-2300 rpm



260-hp Short Stroke V-8 . . .
Torque: 430 lbs-ft @ 1800-2300 rpm



226-hp Short Stroke V-8 . . .
Torque: 350 lbs-ft @ 1800-2300 rpm

American Business buys more Ford Trucks than any other maker!

of endurance features ever

They're all standard in Ford's new Super Duty V-8's

more perfect seating and sealing. Any valve material requires good cooling for long life. Ford's new Super Duty engine design makes more coolant available for lower valve temperatures. This coolant flowing past Ford's integral valve guides quickly carries away valve heat. In addition, exhaust valves are sodium-filled for rapid transfer of heat from head to stem. The sodium is added by a unique process that eliminates welding, thereby strengthening the valves.

Hot testing of every Super Duty V-8 is a typical example of Ford's quality control. Each engine is run for 20 minutes to check smoothness, timing, valve lash adjustment, oil pressure, and push rod rotation.

The engine is then partially disassembled. Parts are inspected for condition and alignment. Special attention is given to bearings and other items that might cause premature failure. The engine is then reassembled and run for about 10 minutes to check timing, noise level, acceleration, smoothness and coolant, oil or compression leaks. Only Ford uses such a detailed inspection of every engine. This is done to provide you with a more dependable truck.

New submerged electric fuel pump virtually eliminates vapor lock and maintenance problems. Mounted in the bottom of the tank, it pushes solid fuel under pressure from tank to carburetor. Its electric motor is sealed in a stainless steel capsule, and operates the pump by magnetic drive.

Every engine part is a truck engine part designed and built exclusively for Ford's all-new Extra Heavy Duty

trucks. The same attention to detail required for durability in the major components has been carried over to all other parts as well. Listed below are but a few typical examples:

Stainless steel gaskets at heads and exhaust manifolds practically eliminate tie-ups due to blown gaskets.

No external oil lines to break. Oil filter and air compressor are mounted directly to block.

Valve stem seals are of same material developed for use in government missile program.

Rotor-type oil pump maintains high output, virtually unaffected by normal wear from extended operation.

Dual exhaust system provides far easier breathing and higher volumetric efficiency.

Alternator system replaces generator for longer electrical life.



Biggest Ford trucks ever built! Ten new series—Tilt Cabs, Conventional, Tandems—up to 51,000-lb. GVW, 75,000-lb. GCW. For complete information see your local Authorized Ford Dealer.

Big truck built...big truck powered...at Ford's low prices!

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

For more details circle 274 on enclosed return postal card

Manufacturers' Literature

(Continued from page 142)

ACCESSORIES FOR DEMOLITION AND DIGGING TOOLS, a 24-page bulletin, Form 4190, available from Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y. describes 16 variations of digging and demolition tools and 64 accessories. A useful page on reforging, sharpening and the proper method for hardening these tools is included. A special

section tells about Ingersoll-Rand's safety tools of forged beryllium copper to be used where sparks cannot be tolerated.

For more details circle 198 on Enclosed Return Postal Card.

THIS IS KOEHRING, a 40 page brochure released by Koehring Co., 3026 West Concordia Ave., Milwaukee 16, Wis., presents a history of the company and its divisions and subsidiaries. The Koehring Machine Co. was incorporated in 1907 by Philip Koehring, his brother William, and a friend,

Richard Kiel, each contributing \$400 to launch the venture. A one-story building was rented in Milwaukee and their first concrete mixer, a trough-type steam driven unit, was successfully produced. Koehring now consists of nine divisions, eight in the construction field and one in the industrial machinery classifications, and is one of the world's largest manufacturers of construction equipment.

For more details circle 199 on Enclosed Return Postal Card.

MANITOWOC ENGINEERING CORP., Manitowoc, Wis., has published a 6-page catalog describing their new 3-¹/₂ yd model 3600 shovel which is also convertible to crane, dragline and clamshell applications. Full specifications are given and the many exclusive engineering features are outlined in detail.

For more details circle 200 on Enclosed Return Postal Card.



low initial cost low erection cost lowest maintenance cost

Here's a new all-aluminum sign developed especially for the large signs required on major expressways. The "Increment Sheet Sign" consists of aluminum increment sheets hung vertically on a supporting frame. It can be made in any height or width, and for ground or overhead installation. Each sheet engages with the adjacent sheet, providing a smooth-faced sign panel.

The advantages are obvious; new lows in the cost of material, installation and maintenance. The aluminum never needs painting or other costly maintenance. Erection is quick and easy. Reflective materials or painted backgrounds are available in any type letters or symbols. As for strength, the sign above, on New Jersey's Garden State Parkway, is designed to withstand wind in excess of 100 m.p.h.

Send today for new pamphlet with full engineering data.

ONE RESPONSIBILITY TOO

Through our associate company, Pfaff & Kendall, Tassco can offer a complete range of standards and supports for ground signs and overhead spans to meet any requirement.



TRAFFIC & STREET SIGN COMPANY
84 Foundry Street, Newark 5, N.J.

... for more details circle 335 on enclosed return postal card

146

REPORTS ON AUSTIN-WESTERN'S HYDRAULIC CRANE: H. P. Gould Company of Chicago has made independent reports on the experience of two companies with the hydraulic crane made by Austin-Western Division of Baldwin-Lima-Hamilton Corp., Aurora, Ill. The reports are from Hunkin-Conkey Construction Co., Cleveland, Ohio, on miscellaneous construction and yard work; and the Shell Oil Company on crane use at its Wood River Refinery at Roxanna, Ill. The Hunkin-Conkey report carries a breakdown of maintenance and operating costs. The reports are available from Austin-Western.

For more details circle 201 on Enclosed Return Postal Card.

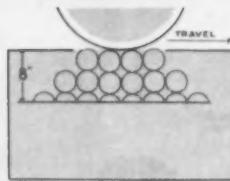
THE YALE AND TOWNE MANUFACTURING CO., 11000 Roosevelt Blvd., Philadelphia 15, Pa., has published a new bulletin outlining the features of the Yale duplex hydraulic lifting cylinders for very high free lift with industrial lift trucks.

For more details circle 202 on Enclosed Return Postal Card.

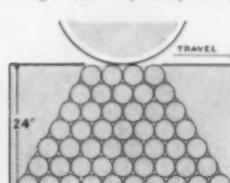
THE OLIVER CORPORATION, Industrial Division, 19300 Euclid Ave., Cleveland 17, O., has released a bulletin describing the latest improvements in the OC-4 crawler tractor. It stresses the varied uses of the tractor and points up the four different versions. It also covers the OC-46 loader equipped with a $\frac{1}{2}$ yd. bucket.

For more details circle 203 on Enclosed Return Postal Card.

TERRAPAC WINS ANOTHER JOB AGAINST 50-TON ROLLER



**CONVENTIONAL
STATIC COMPACTION**
Static rollers, relying on weight alone, produce friction forces between soil particles causing bridges to form. Terrapacs break bridges for deep compaction.



**TERRAPAC DYNAMIC
COMPACTION**
Vibratory energy breaks frictional forces binding soil particles together, allows soil to sift down producing uniform densities at greater depths.

12 CH-30 Vibratory Rollers Tame 8,000,000 Yards on Griffiss Air Force Base

Once again the Terrapac way of compaction has made a name for itself, this time on the Griffiss Air Force Base in Rome, New York where the contractor compacted 7000 yards a day achieving 97, 98, 101 and 103 percent modified AAHSO density respectively in 2, 4, 6 and 8 passes . . . Moreover, this desired density was often obtained with lifts up to 15 in. compacted thickness (6 in. with 12 in. maximum specified) . . . This site consisted almost entirely of sandy silt, ranging from fine to coarse, with traces of clay usually in thin laminations . . . As a result of this showing, 12 Terrapac CH-30 vibratory rollers were picked as chief compaction tools . . . Contact your local Vibro-Plus distributor, let him arrange a Terrapac demonstration, and, if desired, supply you with complete details on the above job.

41-51



VIBRO-PLUS PRODUCTS, Inc.
STANHOPE, NEW JERSEY

WORLD'S LEADING MANUFACTURER OF VIBRATORY EQUIPMENT FOR OVER TWO DECADES!

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PROOF!

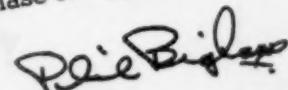
To Whom It May Concern:

You can be sure of making the wisest investment and obtaining the most productive equipment by inviting leading manufacturers to participate in competitive on-the-job demonstrations with qualified operators.

The demonstration reported here was held last year at my request and I personally kept the records of the times and tonnages in all instances.

The results gave me definite proof of the superior performance of the "PAYLOADER" machine and was the basis for my recommendation for the purchase of this equipment.

PHIL BIGHAM
County Engineer
Barton County, Kansas



Independent Tests with Factory-Trained Operators Prove **PAYLOADER®** Best

You can't make money on manufacturers' claims. It's performance on-the-job that counts. That is why we welcome the opportunity to report the results of independent, unbiased competitive tests such as the one tabled below. "PAYLOADER" tractor-shovels will not only give you greater performance and production . . . they'll PROVE it on your job.

	Run No.	Travel Distance	Model No PAYLOADER	Machine "A"	Machine "B"
Loading Trucks from Stockpile... Tons per Hour	1	—	432	289	222
	2	—	391	324	254
	3	—	366	311	259
	4	—	358	288	285
Loading Trucks from Windrows... Tons per Hour	5	150 ft.	327	192	207
	6	150 ft.	313	192	178
	7	100 ft.	390	262	240
	8	100 ft.	394	274	253
Overall Average...Tons per Hour			371	267	237

Ask about . . .



Your Hough Distributor offers the widest choice of financing plans: TIME PAYMENT . . . LEASING PLANS*, with or without OPTION TO PURCHASE — whatever one best fits your needs for the purchase of "PAYLOADER" units. See him today.



Modern Materials Handling Equipment
THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



. . . for more details circle 285 on enclosed return postal card

*Available in Continental U. S. A.

THE FRANK G. HOUGH CO.

768 Sunnyside Ave., Libertyville, Ill.

Send more data on 4-wheel-drive "PAYLOADER" tractor-shovels
as checked:

HO—9,000 lb. carry cap. (1 to 4 cu. yd. buckets)
 HH—7,000 lb. carry cap. (1/2 to 3 1/2 cu. yd. buckets)
 HU—5,000 lb. carry cap. (1/2 to 2 1/2 cu. yd. buckets)

Name.....

Title.....

Company.....

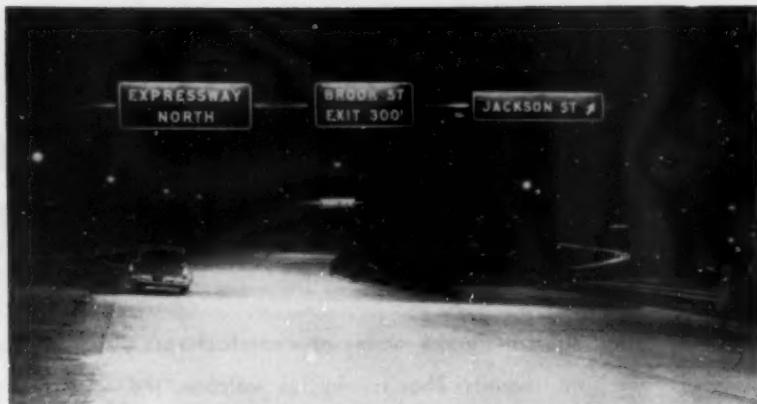
Street.....

City..... State.....

Highway Lighting

300 Signs for New Chicago Toll Skyway

Those who can't read might as well stay off the modern superhighway. Employees of Federal Sign and Signal Corp. are shown here putting the finishing touches on 300 highway signs designed for the 7½-mile Calumet Skyway in Chicago. Installation of the reflector and neon illuminated signs began in February.



Break concrete BETTER • FASTER

 Brunner & Lay nail points rugged, standard everyday tools.
1 ½ x 6; 1 ¼ x 6—14", 18" & 24" l.u.c.

 Sabur® Points for use in concrete with really "tough" aggregate.
1 ½ x 6; 1 ¼ x 6—16" l.u.c.

 Keen-Kut—a real concrete buster to increase breakage production.
1 ½ x 6; 1 ¼ x 6—14" & 18" l.u.c.

with the BRUNNER & Lay tool
best fitted for your job

Only Brunner & Lay offers a complete line of pneumatic tool accessories—each specifically designed for a particular need—each incorporating Brunner & Lay functional design based on 74 years experience—plus the features and rugged construction that have made Brunner & Lay the leader. Ask your Brunner & Lay distributor to show you the tool best for you. Write for new, complete catalog, No. 756.



Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. • Brunner & Lay Rock Bit of Philadelphia, Inc., 2514 East Cumberland St., Philadelphia 25, Pa. • Brunner & Lay of Los Angeles, Inc., 2425 East 37th St., Los Angeles 58, Calif. • Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas • Brunner & Lay Rock Bit of Asheville, Inc., Sweeten Creek Rd., Asheville, N. C. • Brunner & Lay of Portland, Inc., 660 N. Tillamook St., Portland 12, Ore. • Birmingham Rock Bit Co., Inc., 5-18th St., S.W., Birmingham, Ala. • Brunner & Lay, Inc., 2 Santa Fe Drive, Denver, Colo. • Brunner & Lay (Canada) Ltd., 6301 Cote de Liesse Drive, Dorval Station, P. Q. Canada.

... for more details circle 250 on enclosed return postal card

150

GE Conducts 1st Highway Lighting Institute

The nation's first Highway Lighting Institutes were held last month (February) at General Electric's Outdoor Lighting Department, Hendersonville, N. C.

A total of 79 representatives of the U.S. Bureau of Public Roads, 30 states, the District of Columbia, and Puerto Rico attended the two three-day sessions which were designed to familiarize members of state highway departments and the BPR with highway lighting systems and modern design concepts that can be used to help provide maximum nighttime safety at the "seven deadly areas of driver decision" on the 41,000-mile federal highway network.

Attendees received an indoctrination in basic highway lighting system design and application and participated in workshop sessions devoted to the design of typical lighting systems for intersections, cloverleafs, tunnels and underpasses, bridges and viaducts, heavily-traveled urban highways, guide signs, and access roads.

General Manager Joseph T. Baily of the Outdoor Lighting Department hailed the institute as "a successful beginning in helping state and federal highway officials solve the problem of lighting portions of the vast national highway system," and commented that similar technical institutes will probably be held at Hendersonville in the future.

Experimental Lighting at RR Crossing

This railroad grade crossing, which cuts across Houston's heavily-traveled (Continued on page 156)

Aired at ACI Meeting

PROS AND CONS OF READY-MIX FOR HIGHWAY PAVING



- For street work, bridges, and odd-lot road jobs, "yes"—but "no" for most highway paving. That is the challenge being faced by ready-mix concrete producers in most states today.

More "cons" than "pros" were voiced by critics, invited to say their piece at a session of the American Concrete Institute's recent Chicago convention.

By James R. Cummings, Assistant Editor

A PANEL MEETING on "Ready-Mixed Concrete in Pavement Construction" was a feature of the combined conventions of the National Sand and Gravel Association and the National Ready-Mixed Concrete Association held in Chicago in February. The audience, previously warned to defend its collective jaw, was belabored with reasons why the ready-mix concrete industry was having such a hard time getting pavement work.

The first speaker was Joseph J. Waddell, project materials engineer for Joseph K. Knoerle & Associates, Inc., consultants to the Illinois State Toll Highway Commission. He said the problem which ready-mix producers face is not one of prohibitions and injunctions against its use, but rather the positive task of meeting specifications.

Waddell sent questionnaires on this subject to 25 section engineers on the toll road, receiving 20 replies. He asked, "Do you approve of transit mixers for paving?" Of the 20 answers, one said yes, nine said no, nine gave qualified answers, and one made no response.

Truck mixers can't handle dry material, was one reply; they can't handle water properly. Another: they are hard to maneuver in front of the paver. The speed of discharge of the rotating type drum mixer is too slow to keep up with the finishing equipment, was a third objection.

Some other viewpoints: transit mixing requires making a mixer operator out of truck drivers. There is lack of control of the concrete between batch plant and the site of the paving.

To meet the variety of conditions under which a transit mixer must operate, it was said, there should be a recorder on each truck to give: size of the batch; water added; number of drum revolutions; number of times the driver stops for a beer.

Machinery Problems

Waddell concluded by stating his own opinion that one of the biggest chores the ready-mix industry must face is that of providing machinery to handle the low-slump concrete

demanded by most highway engineers.

Next speaker was R. A. Lonier, engineer of materials for Illinois division of highways, district No. 10, with headquarters in Chicago.

The highway industry spent years, Lonier said, building pavers up to today's rigid standards for concrete that will insure pavement smoothness and uniformity, good joints, etc.—"and then along came ready-mix . . ."

Pavement specifications were changed in 1952 to include ready-mix but a reading of the details of those specifications "just about throws ready-mix out of the window," according to Lonier.

The following requirements which paving concrete must meet throughout most of the nation, he said, serve to put ready-mix in a bad position: It must have uniformity of strength. It must have proper consistency—and this, Lonier added, means in front of the screed, not when it is mixed. Ready-mix people say "well, just add water until you get your slump," but that can't be done, he pointed out.

Huge Structure Market for Ready-Mix in the Highway Program

A state-by-state review of specifications and attitudes on the use of truck-mixed concrete will be published in next month's Roads and Streets. Compiled from a questionnaire sent to state highway department materials engineers, this report will underscore the fact that:

- (1) Only a few states as yet permit ready-mix for paving, but that
- (2) Practically all states report rapid growth in use of ready-mixed concrete for bridges, overpasses, grade separations, retaining walls, sewers, sidewalks, curb-and-gutter, and miscellaneous highway appurtenances.

The volume of concrete for highway structures is growing astronomically. Over 25,000 major structures will be required in the 13-year Interstate road program alone—accounting for 30% of the total construction cost—according to George M. Williams, Assistant Commissioner of Public Roads, as told at the recent ASCE winter meeting in Chicago.

Corroborating many points in the accompanying ACI meeting report, the ensuing staff article will underscore the formidable problems which the ready-mix industry must overcome if it is to get its hoped-for share of business from the expanding highway jobs.

The concrete must be mixed only in the quantity required for use, and that, Lonier said, means in front of the machine and not 200 ft. ahead. Production and delivery must be continuous, insofar as job operation requires. Here, the speaker pointed out, is where ready-mix runs into trouble regarding consistency.

Material must be spread in front of the spreader—and with the roadway often 24 ft. in width, this is where the transit-mix fumbles, according to Lonier. They just dump the material, and can this all be spread by hand without slowing down the work, he asked.

Can ready-mix meet all these requirements? Some contractors slap a vehement "no!" at its use, Lonier said. The problem probably will be licked some day, he added, but, at present, much must be done to get ready-mix that will meet specifications.

In strong rebuttal, Robert A. Hummel, vice president of Consumers Company, noted that ready-mix concrete has been "pretty well scared off major paving projects." But he cited concrete curb, intersection and alley work his company has done and challenges any evidence that it is inferior to paver-mixed material.

Hummel contends that ready-mix concrete at a 1½-in. slump can compare with any produced by a paver, but lists some requirements that

must be met:

- A plant that is accurate in its proportioning.
- A clean mixer.
- Proper blading in the mixer.
- A driver who knows how to run the mixer and can follow specifications as to number of revolutions, etc.
- Proper mixing and agitating speeds.
- Complete control of the concrete from plant to job site.

Hummel went on to say that much of present-day resentment toward ready-mix is directed not so much toward the product itself as at the operator with an inadequate plant or one who gives a poor personal performance.

On central mix versus ready-mix, Hummel said: "The statement that batched concrete requires less inspection than ready-mixed concrete is open to argument. Much can happen between the time a batch truck starts to load at the batching plant and the concrete is discharged on the roadway. If less inspection is given to this type of delivery, maybe too much is being taken for granted."

A paver does have the advantage, Hummel conceded, in placing low slump concrete nearer to the desired spot than a transit mixer. There are various means for depositing ready-mix concrete close to the approximate spot on the sub-grade but they are admittedly un-

satisfactory at present. But they could be improved, Hummel asserted, if there were an incentive.

● The toughest problem to overcome, he said, is one of mechanics: getting enough trucks to handle a transit mix paving job. With modern pavers able to lay from 700 to 800 cu. yd. of concrete per day, a contractor would require—for ordinary hauls—25 transit mixers. Since there are no "hired" transit mixers, the use of so much equipment would cause confusion among his company's other work, Hummel said—"and two or three of these jobs at the same time would cause chaos."

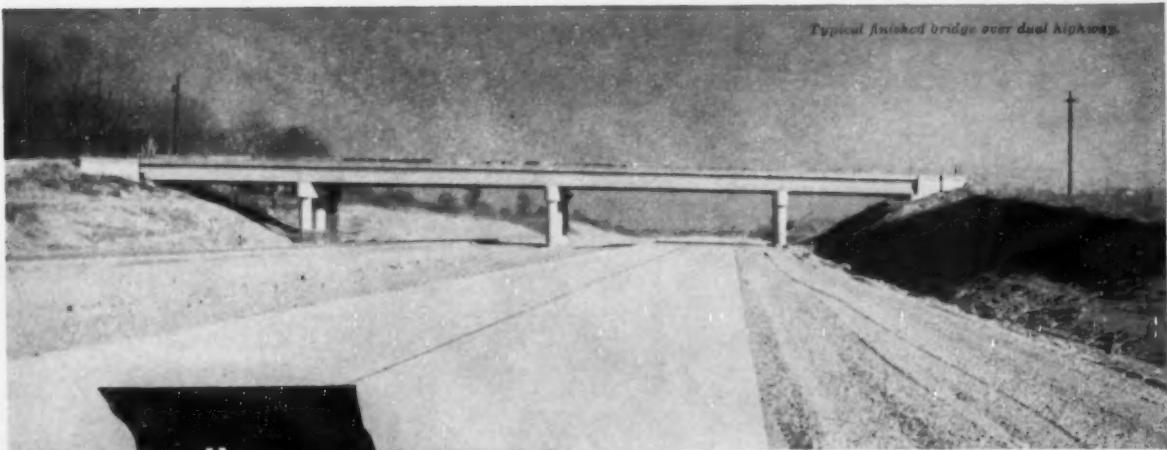
Warner Harwood, concrete paving technical engineer for the highway and municipal bureau of the Portland Cement Association, said that the ready-mix industry *must* meet specifications if it is to get its share of the 50 million cubic-yard-per-year highway concrete market in the next 12 years.

He said that aggregates must meet requirements. If those stock-piled comply with highway specifications, no problem is involved. But all measures must be taken to insure this compliance, even if it involves provision of separate bins for this aggregate as compared to that used for normal operations.

Consistency must be controlled. As long ago as 1924, Harwood said, a prominent engineer stated that a major cause of pavement surface irregularities was lack of uniformity in consistency between various batches of concrete, with consequent unequal settlement of wet and dry mixes. Thus, rigid limits have been placed on allowable slump.

Over 90 percent of the states permit a maximum slump of 2 in. or less for vibrated concrete. Of 35 states specifying or permitting non-vibrated concrete, all but one limit the slump to 3 in. or less.

Discharging concrete into piles at the job site is detrimental to efficient paving, according to Harwood. While modern spreaders can successfully distribute concrete deposited in this manner, there will be various in consolidation between the concrete under the center of the piles and that which is on top. These variations cannot be overcome by the succeeding finishing operations, he said, and they are a significant factor in subsequent unequal settlement which keeps the pavement from meeting required surface tolerances.



Typical finished bridge over dual highway.

How
to save
\$12,000,000
in designing
highway
bridges

...ILLINOIS TOLL HIGHWAY COMMISSION SETS AN IMPRESSIVE "PRESTRESSED" EXAMPLE

The following quotations are taken from a paper, "Prestressed Concrete Bridges for the Illinois Toll Highway," presented at the recent World Conference on Prestressed Concrete by M. E. Bender of Joseph H. Knoerle and Associates, Inc., Baltimore, Md., designers of the bridges.

"Of a total of 289 bridges on the entire project, the superstructures of 224 are carried wholly or in part by prestressed concrete stringers with varying spans up to 107 feet.

"Approximately 448,000 lineal feet of prestressed stringers were required . . .

"A little over 50,000 lineal feet of 36 in. diameter cylindrical prestressed concrete piles will be placed for piers in 90 structures.

" . . . estimates of the entire project show that about 45,000 tons of structural steel members were replaced by prestressed concrete at a saving of approximately \$4,000,000 over report estimates, and nearly \$12,000,000 over steel at prevailing prices.

"Comparatively recent improvements in manufacturing . . . were factors in the selection of prestressed concrete members . . . Through these developments it has been possible to hold the cost of prestressed members at reasonable prices in spite of general rises in material prices."

Roebling, right from the beginning, has been active in the research and application of the prestressed principle. Constantly, with the tremendous benefits of prestressed in all kinds of structures becoming more widely known, its acceptance as a structural method is becoming equally widely applied. We will be pleased to discuss with you — and furnish you with literature on — all phases of the prestressed method. An inquiry to Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, will bring a prompt reply.

ROEBLING

Branch Offices in Principal Cities • Subsidiary of The Colorado Fuel and Iron Corporation

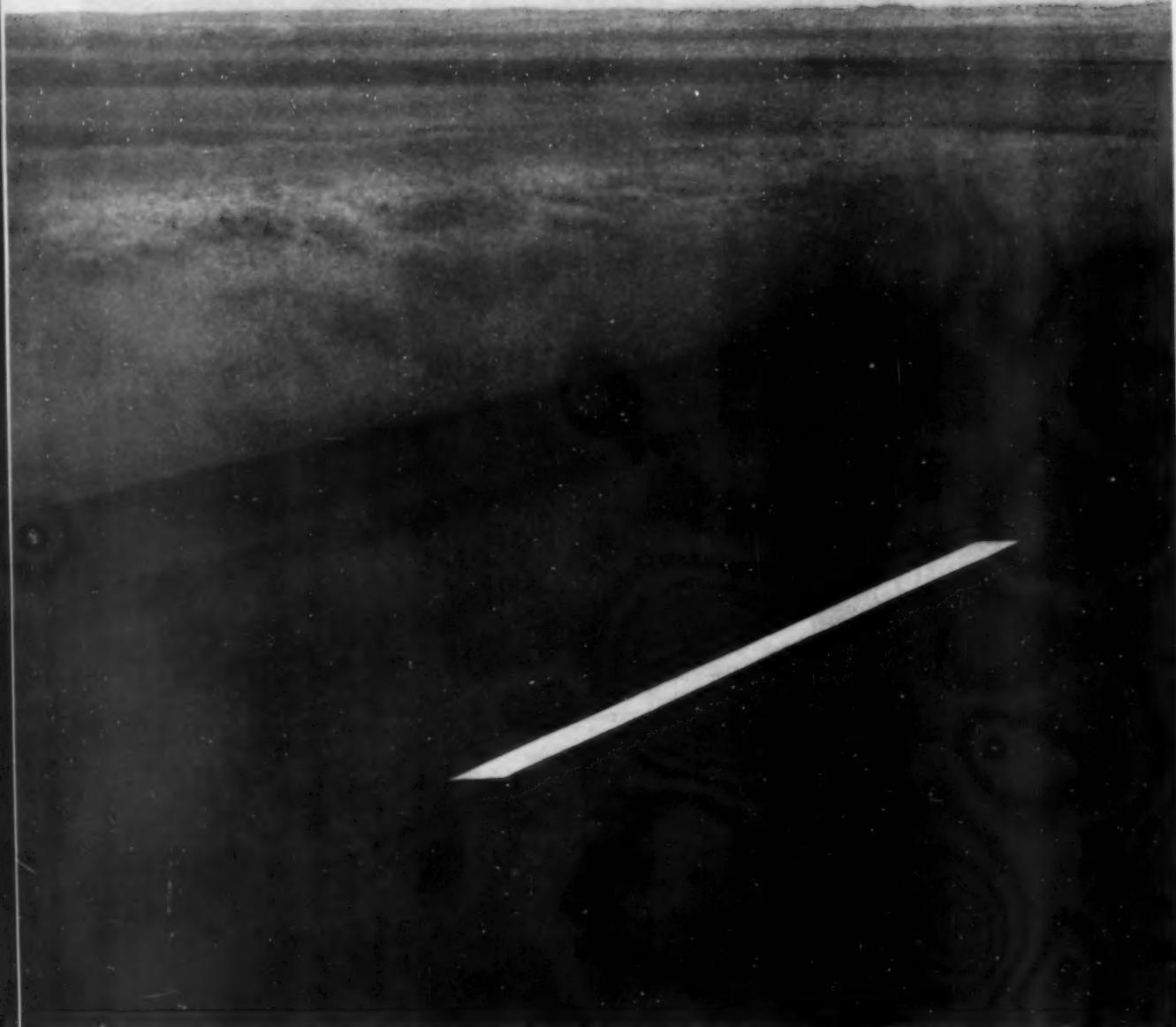
Over-all picture of Material Service Corporation casting bed at Algonquin, Illinois. Shows three rows of prestressed girders for Illinois Toll Highway under different stages of construction. Two additional firms that produced prestressed girders are: Lewistown Midwest Division, American-Marietta Company, La Grange, Illinois; and Midwest Prestressed Concrete Company, Rochelle, Illinois.



Consumers Company casting yard at McCook, Illinois, showing details at end of girder during placing of reinforcing steel. Note group of 12 strands sloping up to top of web. These strands are deflected to a point near the bottom of the beam at the third-points of span. The two "tin cans" core holes in the web for transverse steel. Six loops of 7-wire strand provide a lifting hook. The flat bands around the lower group of strands were easier to assemble than reinforcing bars.

... for more details circle 317 on enclosed return postal card

Saved...\$48,348 a mile...



Heavy-duty ASPHALT pavement on Interstate highway saved North Dakota an estimated \$600,000 ■ ■ ■ ■ ■ ■ ■ ■

■ ■ ■ ■ ■ For the 12.092 mile two-lane Valley City East section of U. S. Highway #10, the State of North Dakota chose modern Asphalt paving (*12" gravel base, 5" Asphalt pavement*).

This decision saved an estimated \$48,348 *a mile* on initial costs alone, compared to bid costs on two lanes of nearby slab-paved section.

"We feel Asphalt paving is superior," said Mr. Ronald Megarry, Megarry Brothers Construction Co. "It not only costs less to lay than rigid type paving but also less to maintain."

Modern Asphalt construction has saved state after state up to 10% . . . and sometimes up to 50% . . . on paving costs alone.



with rugged ASPHALT paving!



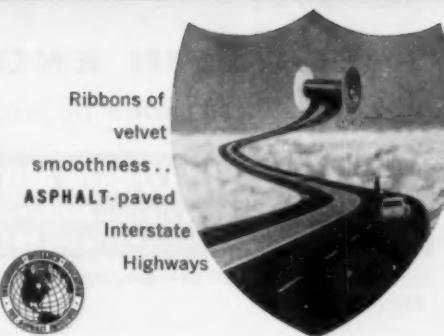
And, in one impartial report, 7 out of 10 states said that heavy-duty Asphalt paving costs less for maintenance. On the New Hampshire Turnpike, for example, maintenance costs have been only \$36.07 a mile, per year.

In winter, snow melts faster, making Asphalt pavements safer. And Asphalt paving is not harmed by de-icing chemicals. Also, heavy-duty flexible Asphalt pavement stands up in temperature extremes.

For maximum economy, comfort and road life . . . at minimum cost . . . make sure your new Interstate Highways are Asphalt-paved. You can bank on their permanence.

The **ASPHALT** Institute, *Asphalt Institute Building, College Park, Maryland*

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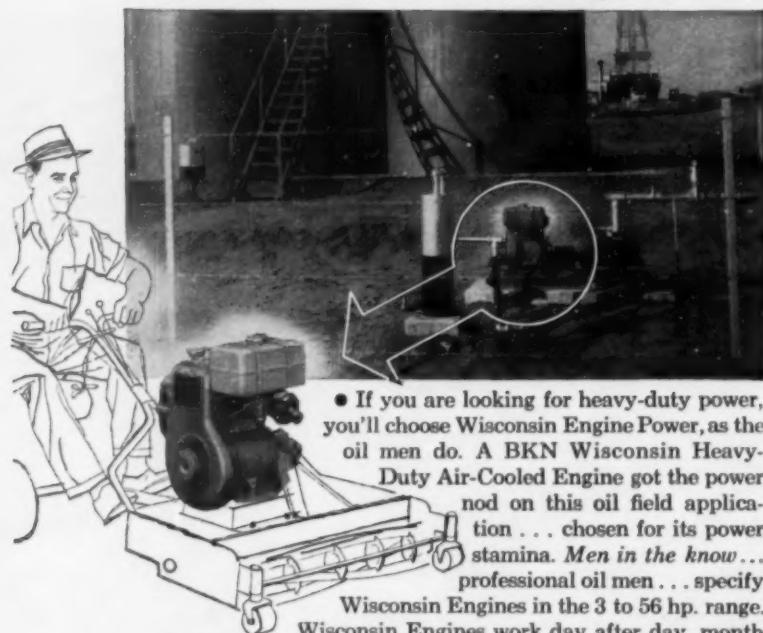
Highway Lighting

(Continued from page 150)

eled Buffalo Speedway, is the site of a new experimental lighting system. Designed to reduce the inherent hazard posed by grade crossings, the system consists of two General Electric Form 406S fluorescent luminaires mounted diagonally at the traffic artery-railroad intersection. The approach side of the luminaires' globes has been painted with yellow acrylic paint to indicate a



How can the oil fields help you select your mower engine?



Wisconsin Engines work day after day, month after month. Operating in remote areas, many are even started and stopped automatically and get only sporadic servicing.

You may never give your mower engine the punishing use that Wisconsin Engines absorb in the oil fields, but the Wisconsin Engine oil field record is the ultimate proof your mower engine will more than stand up under toughest conditions. 2,000 service stations back up Wisconsin Engines... several are near you.

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AB-6164

ROADS AND STREETS, April, 1958

danger area. J. B. White, Houston's director of public service, proposed the lighting system which was installed by Houston Lighting and Power Company. Encouraged by the success of the initial grade crossing lighting system, the Houston City Council has authorized the installation of experimental lighting systems at 14 other dangerous grade crossings.

Lighting Adds to Highway Capacity, Study Shows

Lighting helps to increase the capacity of a highway at night, but doesn't have too much effect on speeds. So reports Paul C. Box, street lighting engineer, Kansas City, Mo., in the *Traffic Engineering* for January, 1958.

Two sites on the Berlin Turnpike in Connecticut—one unlighted, the other with fixed lighting—were studied to determine the effect roadway lighting might have on basic capacity at night. It was found that lighting apparently prevented a 5 percent loss in the night capacity of the right lane, experienced when the road was not lighted.

Regarding speed, reductions were found under both lighted and unlighted conditions. However the loss on the lighted segment of the test highway averaged about $\frac{3}{4}$ of the loss on the unlighted part.

Headway loss found in the right lane for unlighted night operations was said to be the most significant result of the study. Prevention of this loss by fixed lighting was demonstrated for at least the route under consideration in the study.

An interesting by-product of the test was the observation that average speeds, in all cases, were in excess of the posted 45 mph limit, on which a progressive signal timing ostensibly was based. In one case on the unlighted section, 93 percent of the drivers were exceeding the speed limit.

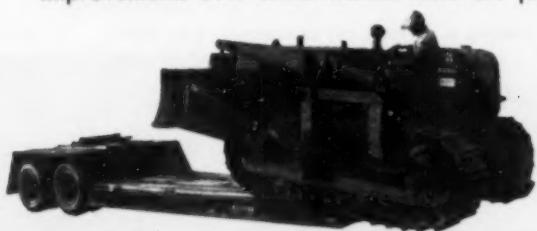
New Dorsey Removable Gooseneck Lowboy engineered for

**One-man
front-loading
with EASE**

"RG" Models
15 to 75 tons



Dorsey's new, patented hydraulic system brings new efficiency and speed to the field of front-loading trailers! Here, at last, is a unit that **one man can really load or unload in 10 minutes**. You must see a demonstration of the "RG" to fully appreciate its many improvements over other makes. Here are just two of many new features:



- Very low loading and hauling heights, even with 20" wheels and full spring tandems (for high speed operation).
- Deck can be raised or lowered while loaded and in transit, to pass over or under obstructions.

For every tough job, there's a tougher Dorsey



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Ask your Dorsey Distributor for the full story on this newest and most advanced of low bed trailers!

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"Powder-Lancing" Cuts Cost of Difficult Concrete Demolition Job



● Massive section cut away, ready for disposal.



● A typical Oxfeld powder lance handle. Equipped with one or more lengths of black iron pipe in its holder, it will produce clean cuts in concrete and reinforced concrete over 12 ft. thick.



● Oxfeld powder dispenser, used in powder-lancing to deliver required amounts of powder at a uniform, accurately controlled rate.

or smaller pieces as conditions require.

In powder-lancing, a mixture of iron and aluminum powder is fed pneumatically into a lance handle and mixed with oxygen. The lance itself is manually operated and consists of a lance handle with one or more lengths of black iron pipe attached. The powder and oxygen are mixed in the lance handle, carried to the cut by the pipe, and produce a bombardment of burning iron and aluminum particles which melts the concrete. Cuts in concrete 12 ft. thick have been made with the lance, but theoretically there is no limit to the depth of the powder lance's cut.

On the General Electric project the turbine testing pit was shaped hexagonally and consists of two concrete safety walls separated by 6 ft. of packed sand. (Inner wall 3 ft., outer wall 4 ft. thick.) Both walls stand about 16 ft. high. A large amount of this concrete had to be removed. Using Linde's powder lance, the concrete walls were cut into huge sections measuring 20 x 16 ft. and weighing up to 18 tons apiece. Cutting speed was about 1½ ft. per hour. After each section was severed, it was hoisted out by a 100-ton bridge crane and hauled away.

The project, handled by James E. Lowe & Sons, of Schenectady, N. Y., took about a month to complete.

● The powder lance making a vertical cut in concrete 3 ft. thick.



ROAD STABILIZATION CAN BE EASY AND ECONOMICAL, TOO

Only 6 Steps in New Sterling Salt Plan

You can repair and stabilize your gravel roads in just six quick steps if you follow the new Sterling Salt "E-Z Plan" for road stabilization. At the same time, you can minimize the recurring troubles of frost heaving, potholes, dust and costly loss of aggregate. Here's the Sterling Salt program:

1. Scarify surface uniformly to minimum depth of three inches.
2. Test materials for compactability.*
3. Spread Sterling Rock Salt on surface. Use 18 to 30 tons per mile of 20-foot road.**
4. Dry-mix materials with blade. Spread uniformly over road surface, preserving an "A"-type crown.
5. Use water if it is available.
6. Roll if possible, or allow materials to be compacted by traffic.

Service and research are the extras in
STERLING SALT

PRODUCT OF INTERNATIONAL SALT COMPANY, INC.

Initial costs of this program are low. And, equally important, roads stabilized with Sterling Rock Salt cost less to maintain! The six-step program can be accomplished with locally available equipment . . . which further reduces costs of stabilization.

*Simple fist test is all that's necessary. Moisten handful of road material and squeeze it. Mass should retain shape when you release fingers. If not, there is too little binder in soil. Stabilization is not advised until proportion of binder is increased.

**Sterling Rock Salt may be applied before or after scarifying. Depth of stabilized materials should not be less than 3 inches.

FREE . . . SALT-STABILIZATION CASE HISTORIES. This folder contains editorial reprints describing techniques and results. Can be helpful to you in planning stabilization for your roads. Just fill in coupon below.



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 Would like further technical information from International Sales Engineer.
 Would like quotation on price of Sterling Rock Salt delivered to my area.

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Heltzel Flex-Plane



UNITIZED BATCHING PLANTS to further speed set-up and dismantling time . . . to give you even greater on-the-job flexibility. The new Heltzel Unitized Plant—like these on a G. Toccalino & Son job in Detroit—is designed in three easy-to-handle sections that go together in minutes. This installation is set up as push-button drive-through for extra fast service. Batcher and scale unit is integral part of center section . . . a real time-saving innovation. (Note new Heltzel E-4 twin-batcher cement plant.)

2202

THE HELTZEL STEEL FORM AND IRON

FLEX-PLANE COMBINATION FINISHER-FLOAT does two jobs in one, reducing crew time to an absolute minimum. The combining of these two jobs is a natural—results in a better finish in faster time. This new machine was thoroughly tested on several jobs last season. Contractors report 4000 feet of 24-foot pavement was floated and finished in a normal day with but two or three hand finishers required. Get the facts on this profit maker before submitting too many quotations.



Engineering

brings you unitized batching, improved forms and a new way to finish concrete

Modern highway design demands top efficiency in highway construction machinery. Portable . . . versatile . . . automatic . . . *fast*.

That's why Heltzel Flex-Plane Engineering works to give you the most modern road-building equipment obtainable. Up-to-date engineering, for example, has produced a definite contractors' preference for Flex-Plane over all other makes. This preference is based, of course, on proved performance.

Find out now what Heltzel Flex-Plane Engineering can mean to you — call on actual users of Heltzel and Flex-Plane equipment, and prove to your own satisfaction that this is the *modern* equipment for modern highway construction.

HELTZEL DUAL DUTY FORMS, such as those shown in use on the Plattsburg SAC base, have been redesigned to assure fast setting and stripping with maximum strength-weight ratio. Sizes available to exactly suit your job requirements.



COMPANY • Warren, Ohio

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ROADS AND STREETS, April, 1958



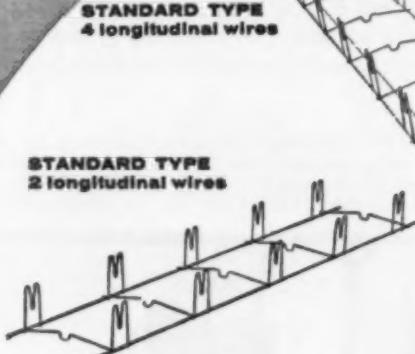
UNIVERSAL PRODUCTS

for highway construction

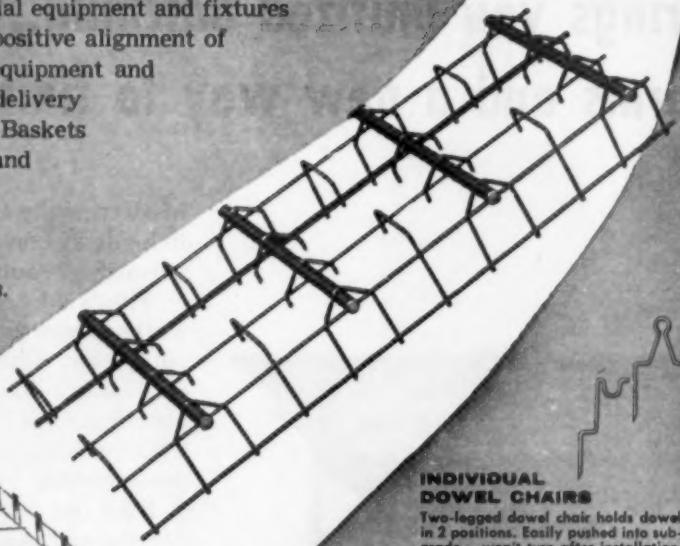
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Universal Dowel Basket Assemblies are designed and fabricated to specifications. Special equipment and fixtures guarantee accurate spacing and positive alignment of dowels. High speed production equipment and modern facilities insure prompt delivery of your requirements. Universal Baskets are approved by Federal, State and private authorities for highway and airport construction.

*Let us quote on your requirements.
Write for complete details today.*



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4 longitudinal wires



HEAVY DUTY TYPE
Maximum strength
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INDIVIDUAL DOWEL CHAIRS

Two-legged dowel chair holds dowel in 2 positions. Easily pushed into sub-grade — won't turn after installation. Wide range of height.

Single Leg Dowel Chair permits quick snap-in of Dowel. Sized to support Dowel from 3" to 6" above sub-grade.

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For providing required tying element along longitudinal joint. Eliminates necessity of bending tie bars or drilling road forms.

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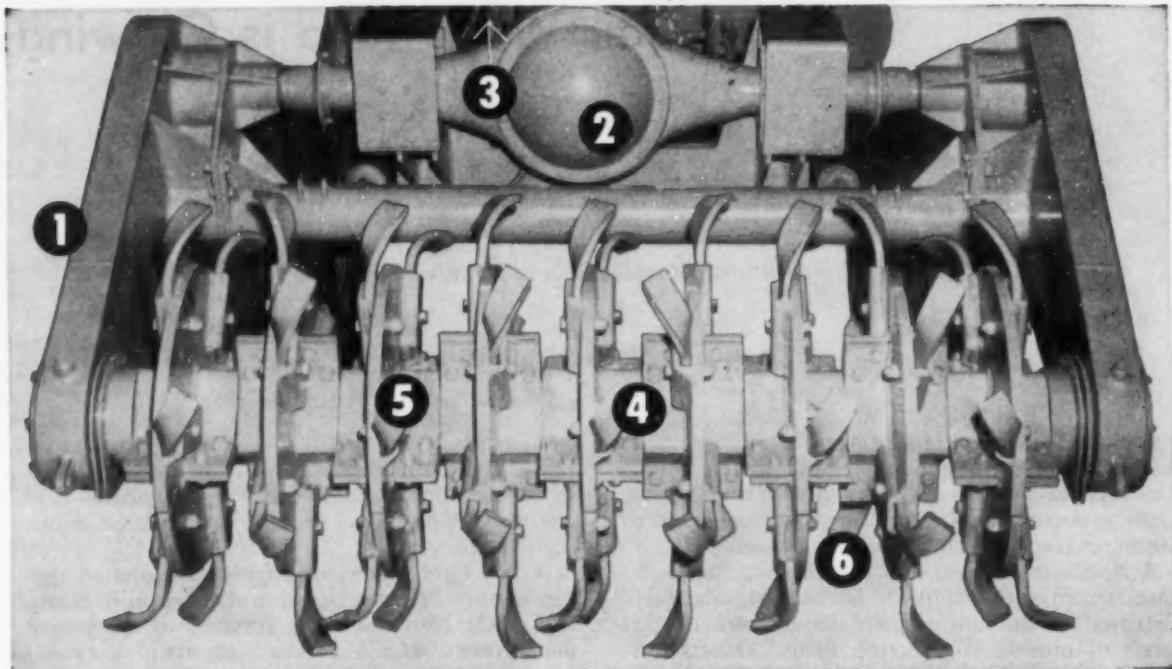
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The BROS Roto-Mixer's performance during the past two construction seasons has been sometimes described as truly amazing. If you

know in-place soil stabilization machines and jobs, as you review the design features below, you'll readily understand why.

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1. Because drives are at outside ends of the rotor shaft, even mixing is accomplished in one pass. No need of a second pass to provide uniform mixing.

Full width mixing or any increment up to 7' is easily handled. Split-disk type tool plates are quickly removed for shoulder maintenance or other narrow work.

2. Three-speed transmission and 150 usable HP at 1800 RPM provides a greater range of mixing speed . . . and mixing control which eliminates "surging" effect.

3. Independent hydraulic control of rotor and hood provide ample space for proper mixing to 12" depths.

Materials are uniformly blended in a smooth, even course.

CUTS MAINTENANCE COSTS

4. 6" square solid steel rotor shaft easily withstands shocks and strains of in-place mixing of rocky soils.

5. Split-disk type tool plates are of heavy-duty construction; quickly and easily removed or remounted.

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Highway Consultants

-Their Work Load is Growing

How they are fitting into the expanding road program is reviewed again in the following—an up-dating of the last report on this subject published in Roads and Streets, February 1956.

Roads and Streets Staff Review

PLAGUED by a nagging shortage of staff engineers and under considerable pressure to get Interstate System projects to the contract stage, state highway departments again last year turned to consulting engineers to an increasing degree.

A *Roads and Streets* poll reveals that out of 36 states which supplied data, 18 have significantly increased the amount of their design work in the hands of outside engineering firms. Others are continuing to farm out approximately as much of their work load as in 1957. Some on the other hand have never or seldom used consultants.

The states have turned over hundreds of millions of dollars worth of projects to reliable consultants, and a number of state officials do not hesitate to give them credit for substantial assistance in getting their Interstate programs off the boards.

The survey reiterated the fact that the role of the consultant has changed from that of a specialist retained only for occasional complex design jobs to that of a production force. The engineering firms are seeking—and obtaining—all kinds of projects, the very routine as well as the complicated. They are carrying the overload in some cases, the top half of the big engineering job.

• This is the case in Michigan, where Howard E. Hill, deputy commissioner for engineering, reported some 25 firms are handling 50 percent of the department's design load. (But this load is to be reduced, is the latest announcement).

The largest user of private engineering services is New York state. There, some 84 percent of the design work load is currently being accomplished by consultants. This percentage represents nearly \$1.1 billion worth of new construction, 688 miles in all.

Among other states relying heavily on consultants are the following:

Virginia has ten consultants making detailed location studies on 300 miles, eight consultants preparing detailed road construction plans for 85 miles, and eight consultants drawing plans for 120 structures.

In Utah, G. B. Hill of the state department reports, "We estimate that the use of consulting engineers is adding the services of approximately 240 engineering personnel in the consummation of our highway program."

A. W. Lane, Vermont engineer, estimated that consultants being retained for state projects are adding the efforts of about 200 men to the department's own 300. Their services are mainly confined to surveying and designing.

In Wisconsin, state highway engineer E. L. Roettiger reported, 22 firms accomplished a wide variety of assignments in 1957 requiring an estimated 190 man-years at a cost of nearly \$2.7 million.

• South Dakota has utilized consultants somewhat differently from other states, which, generally, have turned to the outside engineers for help on big Interstate jobs. In this state, however, consultants handle all of the federal-aid secondary road preliminary engineering for the counties. Their volume is increasing steadily.

South Carolina uses consultants for bridge design only.

Louisiana originally planned to accomplish all rural sections of its Interstate System with its own forces. As urban projects ran into stalemates, however, the department decided to build up a backlog of all kinds of projects it could turn to in an endeavor to maintain a full construction program. Consultants were called in for this purpose. At the time he reported, urban engineer T. A. Buie listed 14 consultants who were establishing routes, making preliminary plans and final construction plans for some \$300 million worth of construction.

Massachusetts has twice as many consultants at work on state jobs as she had a year ago.

Kentucky is another state that has turned to consultants for help in getting her Interstate work under way. Some 22 firms are engaged on state and secondary projects, about the same as the year before. But consultants have been retained for twice as much work on Primary System jobs and five times as much Interstate work.

—Their Special Problems are Diverse

Ohio has 27 consultants on her retainer list, in spite of the fact that two limitations are applied to the practice of negotiating for private engineering services. First, a project must be in excess of \$1 million to permit turning to an outside firm. Second, plans for urban projects must be prepared by either the city or state personnel.

Illinois, which has a heavy Interstate program under way, has doubled the number of consultants on its retainer list. Nearly 40 firms are providing construction plans for some 338 miles of Interstate routes and 88 miles of other primary highways, valued at about \$300 million.

Twenty-three consultants are currently handling assignments for the *Florida* state road department and officials there believe this number will probably increase.

• At one time, one could generalize that consultants seldom got west of the Mississippi, as far as state highway departments were concerned. The far western states have long endeavored to do all the work they could with their own forces. *Washington, Montana, Wyoming, Oregon and Texas* reported they seldom turn to consultants.

California is accomplishing several hundred million dollars worth of work a year with little outside assistance. "Our policy is to handle all engineering in connection with all phases of our highway department with our own forces wherever possible," *G. T. McCoy*, state engineer, reported. There may be only two to six special exceptions a year.

W. C. Williams, state highway engineer for *Oregon*, reported, "To date we have not used the services of any consulting engineers. We have an adequate and efficient engineering staff, and it does not appear that we will have need of services of consulting engineers in the foreseeable future."

Texas, likewise, offers few opportunities for the private firms. The department met the expanded road program with plenty of plans on hand.

• The pattern is being broken, however, and *Texas'* next-door neighbor, *Oklahoma*, has 28 consulting firms making field surveys and preparing construction plans. These outfits are advancing the status of some 380 miles of highways, representing about \$132 million worth of construction.

Both consultants and highway departments are interested in the outcome of a problem that has recently arisen. A few weeks ago the federal Department of Labor initiated suit against an internationally famous consulting engineer for failure to comply with the federal wage-hour law on a highway project. The department insists that the firm of *Singstad & Bailey* came under the requirement during work on the *Baltimore Tunnel*.

The federal officials reason (1) that the project was interstate in character (it carries interstate traffic), and (2) that the engineer's work was interstate in character (he maintained offices and did work in other states). Therefore, they say, all work performed on the project should have been governed by the federal overtime regulation.

"PLEASE DEFINE OUR DUTIES MORE CLEARLY"

A clearer definition of the job the consultant is expected to do is necessary in many states, according to a representative of a leading firm of consultants, who requests his name be withheld. He feels that this is necessary before fees can be set intelligently to assure the consultant a fair profit and help the roadbuilding agency estimate its engineering costs. We quote:

"In our experience, we find some variations in the different states as to the contractual relations with consultants. Many highway departments differ in the scope of the services to be provided as well as the degree of detail to which the consultant is called upon to complete his services. We feel a better understanding might be obtained in clarifying the work which the consultant is expected to do.

"With the program in its early stages and the many agencies involved in approving a specific plan, it is almost impossible for a consultant to estimate what his costs might be and submit proposals covering services for determination of final layouts.

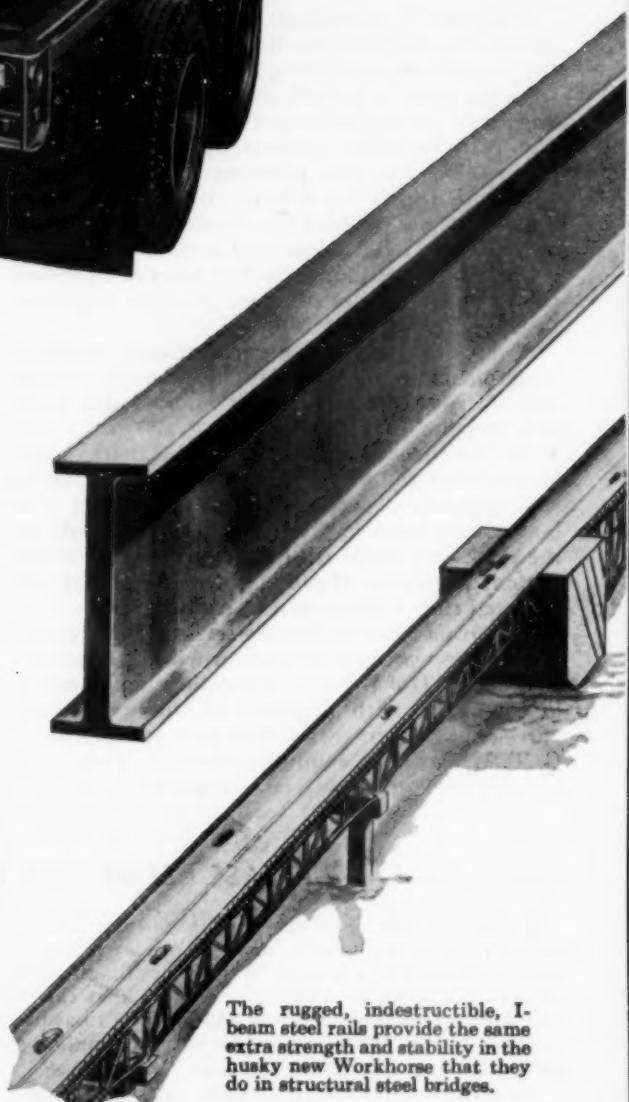
"The question of design criteria has caused some backtracking in preparation of designs. Interpretations of contracts as to extra payment for changes caused by such factors as change in design criteria should be clarified. Unless this is done, a consultant may be called upon to absorb considerable expense in revising designs and plans to conform with changes in design criteria.

"Expediting of approvals by agencies involved is also a disturbing factor in controlling costs.

"There are many consultant organizations who are experienced and qualified to do various types of the highway program, particularly the Interstate System. As in every line of business, they expect to show a profit for their work. Fees paid to such consultants must cover expenses, particularly of overhead, of which a highway department keeps no record in their own work. Rent, light, heat, transportation and many items of overhead found in a consultant's office must be taken care of in his fees."



The deep, full-length, girder type, I-beam rails and full-width, I-beam crossmembers are welded together for the same type of powerful structural steel construction used in many modern bridges.

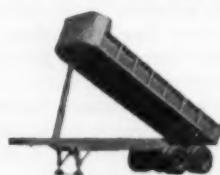


The rugged, indestructible, I-beam steel rails provide the same extra strength and stability in the husky new Workhorse that they do in structural steel bridges.

FRUEHAUF BUILDS THE HAULING INDUSTRY'S BIGGEST LINE OF RUGGED CONSTRUCTION TRAILERS!



CABLE DUMPS



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BULK CEMENT TANKS



The longitudinal steel I-beam rails actually become part of the Trailer floor in the new Workhorse Platform, and directly support lift trucks and loads!

The New Fruehauf Workhorse Platform Is Tough As A Bridge!

... yet saves up to 1,200 pounds in weight

The new Fruehauf Workhorse Platform is built for strength, lasting power, and big weight savings.

Its deep, deep 19½" I-beam channels directly support loads, lift trucks, and all the forces that tax and strain platform strength.

They do the job, and last, because they're extra deep, continuous, forged of the toughest low alloy, high-tensile steel.

Rugged, full-width I-beam crossmembers at 18"

intervals increase rigidity and carrying capacity. Everything about the Workhorse is designed for top payloads and hard work.

Call your Fruehauf Branch while you're thinking of it now for a complete look at the toughest platform built!

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ROADS AND STREETS, April, 1958

HIGHWAY CONSULTANTS

(Continued from page 165)

Maryland officials have issued a call to arms against the action. Not one cent of federal money is involved, they declare. The job is a toll-financed facility.

"It is quite apparent," one Maryland attorney said, . . . "that it is the intention of the Department of Labor to use the action against Singstad & Bailey as a stepping stone to other legal actions, seeking to hold all highway construction on the Interstate System, inso-

far as consulting engineering services are concerned, subject to the provisions of the Fair Labor Standards Act."

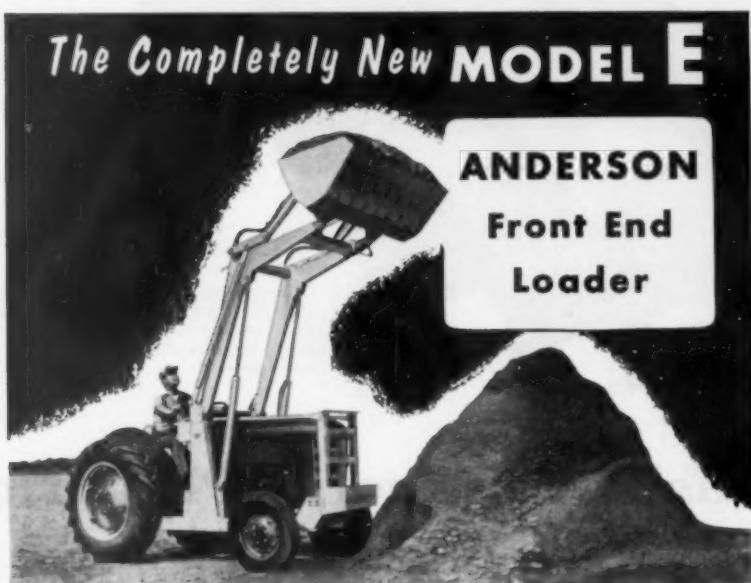
The U. S. Labor Department intends to start a whole series of law suits against consulting engineers throughout the United States who are engaged in any kind of highway work, to bring them under the

federal law, the state official predicted.

Labor Department officials feel there is precedent for their action. They cite similar cases that have been decided in the courts in their favor. And they admit that future actions will not necessarily be restricted to Interstate System projects.

Consultants Often Handicapped by Inadequate Surveys

By letter, comment from John Clarkson, The Clarkson Engineering Company, Boston, Mass.



All You Look For In Higher Priced Loaders

Skillful design and outstanding features make the new Anderson Model E the performance leader among loaders designed for utility tractors.

Clean, in-place breakaway under load . . . positive bucket filling . . . load carried high or low . . . these are only a few of the "on the job" extras found in this completely modern heavy-duty loader.

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Write for new catalog.

WILDWOOD, N.J.

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AS PART of our general consulting practices we are extensively engaged in highway work, traffic studies, location studies, design and completion of the plans, specifications and estimates in eight states and the District of Columbia. Most of this work is for the state highway department or its equivalent.

Also our staff is performing consulting work and minor study work for several municipalities in these states.

Specifically this includes traffic assignments for location problems, interchange problems and the like to the completion of the plans, specifications and estimates. In some cases the states perform their own traffic location and survey work; in other cases these matters are included in our contract so that we perform the complete service.

In some states we perform construction inspection services. We are staffed competently to perform the planning work all the way through to the completion of the contractors' final estimates at the completion of the construction.

A large part of our work—but by no means all—is on the Interstate System. Actually we have completed and are in the process of designing work on the federal-aid primary, secondary and urban programs in addition to the limited-access type roads normally thought of for the Interstate System.

Now as to some of the special problems of the engineering consultant. Normally we are primarily design engineers and construction inspectors; however, we have been forced to perform with our own forces survey work, not because of contract requirements, but because

of the need for accurate and complete surveys.

We believe that one of the principal problems facing us and other design engineers is the fact that some agencies, state, federal and local, contract separately for surveys and mapping and then turn the results of such survey contracts over to others to perform the design. This causes a very irrational division of responsibility and I find a considerable loss of time, efficiency and money due to inadequate ground and aerial surveys performed outside our control. Errors which creep into survey procedures end up by wasting a considerable amount of design and drafting time.

Varying Accuracy

Also some states require a higher accuracy for surveys than do many other highway departments and, therefore, spend more money for surveys. This additional expenditure of money results in savings far beyond the cost in its result in the design room. I think this is a particularly vital problem in civil engineering work, and many consultants have spoken to me about it on their own. I know the private surveyors would like to have a prime contract, but I believe that as our own subcontractors they fare much better financially and otherwise.

In some states the agency for which we work is in need of better liaison. Cases have arisen where almost totally inexperienced personnel have been used for this liaison work; in other cases the liaison engineers are not granted the authority to make decisions on the drafting board or in the field. In other cases the liaison work for all consultant work is centralized on one person causing a severe overload on that person's desk, a considerable delay in the progress of the project and considerable cost to us both financially and emotionally.

I see no reason why a consultant contract is not considered in the same light as a construction contract, as far as the appointment of resident engineers is concerned. It only takes one for the consultant's contract, where it takes many for the construction contract, but the problem is otherwise the same.

We have run into no professional and ethical problems. Most of the states with which we do business have already formulated in their

(Continued on page 174)



There's no paint on Lufkin Chrome Clad Anchor Tape lines.

The bold, black markings are bonded to the basic metal . . . protected with several electroplatings that give extra strength to the line. The final metal coat is Lufkin's

exclusive Chrome Clad finish. Glare free, smooth, rust resistant . . . the most durable tape line you can buy.

Anchor lines are replaceable in the genuine-leather, hand-stitched case. Available with markings in feet, 10ths and 100ths.

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An ARROW MOBILE HYDRAULIC HAMMER working on a Dayton, Ohio, street, breaking street, gutters and curbing.

POWER TO SPARE for BREAKING CONCRETE

With a 1,000 pound weight and an EIGHT foot drop—something's gotta give. If it's concrete you're breaking, it gives quickly and easily, when you put an ARROW MOBILE HYDRAULIC HAMMER on the job. Saves you

time and money on other jobs, too, such as cutting asphalt—tamping backfill—driving posts or piling. If you have any of these jobs to do now, here's a tip, ask to see what an ARROW MOBILE HYDRAULIC HAMMER can do on YOUR job.

ASK YOUR DEALER FOR A DEMONSTRATION

Arrow Manufacturing Company

DENVER, COLORADO

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• Cat D9 tractor pioneers a mountainside road. Conditions shown are typical of extreme rocky conditions.

THE USE of track-type tractors in rock work presents operating conditions and wear characteristics extremely different than those encountered in routine dirt work. Service life of track shoes, rollers, idlers, links, pins, bushings and final drive sprockets is usually considerably longer in earth operations.

Some owners, whose tractors work in rock operations, do not avail themselves of all the means provided to attain the longest possible service life and the best economic value from their investments. However, many owners of track-type tractors have, through experience, realized that the best way to take on rock work is to prepare to combat the problem of increased depreciation.

Track shoes are the first consideration. Wide shoes are most satisfactory when flotation is the prime consideration, such as operating in mud, gumbo or in most agricultural applications. It is a known fact that track shoes are more susceptible to breakage where rock is encountered. Wide track shoes have greater "overhang" beyond the track link than narrow shoes, placing more leverage against the outer edges. The result is that wide shoes are more frequently damaged while working in rock than narrow shoes.

For those specialized operations where a crawler tractor is called

upon to work almost exclusively in rock, double grouser track shoes should be used. In addition to offering much better wearing qualities, the second grouser strengthens the shoe longitudinally, providing much greater resistance to bending or cracking under heavy impact in rock work.

Another factor relative to track shoe service life, when operating in rock, is the adjustment of the idler position on those tractors which have two-position idlers. When idlers are in the "low" position more rapid track shoe grouser wear will be experienced. Idlers should be kept in the "low" position only when necessary for the type of job at hand.

A number of attachments are available for track-type tractors and

• Track roller guards are bolted to roller frame of a D9 tractor. Guards pay for themselves by reducing maintenance and parts replacement.

TRACKS IN ROCKS

Helpful Operating Hints

the specific application of the tractor determines those attachments which are most usable and most needed. For rock work, the attachment which pays for itself over and over again is the track roller guard group. According to one manufacturer, Caterpillar Tractor Co., field experience with heavy crawler tractors in rock work has proved quite conclusively that track roller guards effectively protect the component parts of the track and provide maximum service life.

• For example, on many rock jobs, with identical model tractors working side by side, doing the same type of work, the tractors which were not equipped with track roller guards experienced damage to the component parts of the track. In contrast, very little, if any, damage was experienced on the component parts of the track on the tractors equipped with track roller guards.

Watch the track of a tractor without roller guards when working in rock. Notice what happens, when the tractor works next to a bank or turns in rock. Rock feeds in between the rollers and the track, and as the tractor moves forward or backward a "rock crushing" action is set up. As the tractor moves back-



ward, rock also feeds in between the idler and the track, and as it moves forward, the rock feeds in between the sprocket and the track. All track components are subjected to unnecessary abrasive and impact damage. After all, the track group of a tractor wasn't designed to be a rock crusher.

These damaging conditions exist even when the track tension is correctly adjusted, if the tractor is not equipped with track roller guards. Of course, increased wear and damage is far more likely if the track tension is adjusted too tightly. The track recoil mechanism is designed so the sprocket can, under some conditions, jump a tooth. This feature reduces the possibility of severe damage to the final drive. However, when too much rock finds its way into the track, the recoil mechanism cannot allow sufficient movement of the idler to feed the rock through. The result is the same as operating with an excessively tight track adjustment in addition to the extra damage caused by the "rock crusher" action. The tendency to stretch-out the track causes unnecessary wear and strain on the track links, pins and bushings. Tight track absorbs horsepower and robs the tractor of its full productivity. And this condition may result in damage to the tractor's final drives.

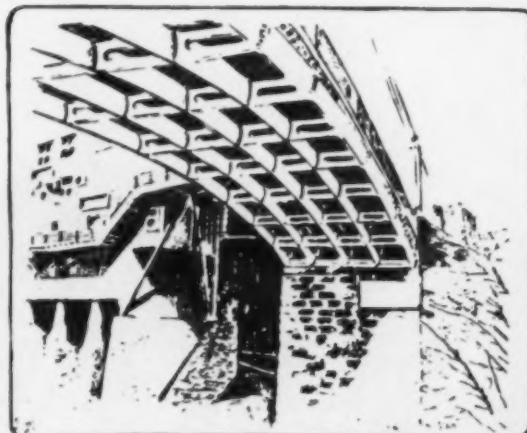
Track roller guards are designed to keep rocks out of the track and have proved their effectiveness under field operating conditions. They are the best insurance available to provide longer, more economical service life for final drives and all track component parts of tractors engaged in rock work. Additionally, these guards assist in holding the tracks on the rollers in rugged and steep slope terrain, reducing wear on the roller flanges and idler pilot rim.

● When operating in fine abrasive rock, it is important for economical operation to recondition all track component parts before they have worn beyond the recommended wear limits.

Review tractor applications before starting a job. If operation in rock is encountered, or will be encountered, use the correct width track shoes and install track roller guards. Recondition track component parts at recommended limits of wear. A realistic approach to "tracks in rocks" applications will reduce downtime, operation and maintenance costs and assure you the best financial return.

Famous Firsts—

AMERICA'S FIRST IRON BRIDGE—1839



By George W. Grupp

AS PART of the 'Interstate highway program' of those days, Congress passed an act on March 26, 1806, which provided for construction of an extension of the National Pike from Cumberland, Md., to Springfield, Ohio. The route of this pike, sometimes called the Cumberland Road, ran through the town of Brownsville, Pa. The main street of this small town crosses Nemacolin Creek, now known as Dunlap's Creek.

This stream was first spanned with wooden bridges and by one of James Finley's chain bridges which collapsed during the winter of 1820. The Finley bridge was followed by a wooden bridge which was replaced with a cast iron bridge completed on July 4, 1839—the first iron bridge built in the United States.

This iron bridge, 25 ft. wide with an 85-ft. span, consists of five tubular arch ribs. Each rib is made up of a number of 3-in.-thick segments 30 in. deep and 10 in. wide, the segments being 5 ft. 9 in. from center to center. At the end of each segment there are eight holes to permit the segments to be fastened together with 1 1/4-in. bolts.

All joints and flanges were chipped by hand because the contractor did not have a large planer with which to face them. To assure uniform bearing at each joint, there was placed between each pair of flanges a rough sheet of lead 1/8 in. thick. Each sheet was ham-

mered down to suit the conditions of the particular joint.

When all segments were in place, the bolts were tightened to give a permanent bearing to all parts of the bridge.

The five arched ribs were provided with transverse panels to support the cast iron plate deck of the bridge. The pavement surface was 18 in. thick macadam.

The 3 ft. 7 in. guard on each side of the bridge is of lattice design made of 1 x 1/4 in. wrought iron on which is mounted a 2 x 3 1/2 in. hand rail.

The idea of the bridge was conceived by Captain Richard Delafield of the Army Corps of Engineers who was in charge of reconstructing the National Pike in 1832. The bridge was built for \$39,901 by John Snowden of Brownsville from designs by John Herbertson, general foreman and draftsman in Snowden's foundry and steam engine shop.

The accompanying sketches were made after the bridge had been in service nearly 75 years. And until recently it was still standing up under heavy, high speed automotive traffic.





An efficient batch plant and dependable Mack dumpers—two important factors in the modern paving methods used by L. G. DeFelice & Son of North Haven, Connecticut. Ten Mack dumpers supplied the dry mix for the two dual-drum pavers.

On the Connecticut Turnpike...

job time slashed by efficient

L. G. DeFelice & Son finished their section of the Connecticut Turnpike well ahead of schedule... thanks to efficient batch-haul paving. Their record for a 10-hour day was 1566 cubic yards—enough concrete for 4255 linear feet of 10-inch, 12-foot pavement. Their daily average over the five-mile, six-lane stretch was almost as high. The job was done with ten Mack dumpers supplying two dual-drum pavers working tandem, with wire fabric

laid on the five-inch pour of the first paver.

Comments Joe DeLucia, project superintendent for DeFelice, "This job kept the Macks hustling. But they never let us down. We figure that our investment in paving equipment and crews is too big to gamble with trucks that can't keep going. On the vital hauling jobs, we rely on Macks."

The medium-sized Mack dumpers used for this important batch hauling were equipped with Mack



Each Mack dumper carried five 1½-yard batches. First batch dumped by opening tail gate. Air-operated batch boards, designed by Equipment Supervisor Felix DiGiusto, speeded dumping of the other four batches. Quickly removable batch boards convert trucks to conventional dumpers with a 10-yard capacity.

batch-haul paving

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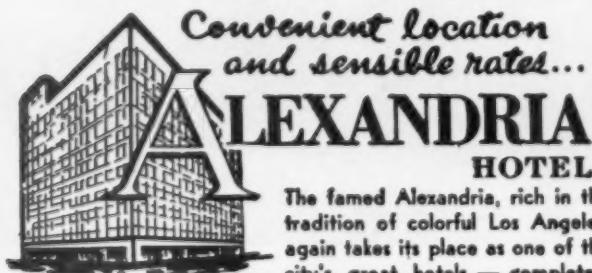
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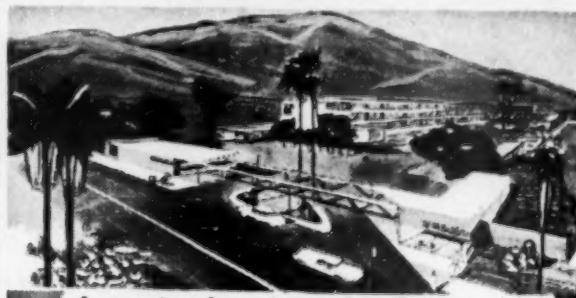
HIGHWAY CONSULTANTS

(Continued from page 169)

minds a satisfactory basis of payment for work, so that competitive bidding has not been a source of annoyance. As to other ethical problems I find that we are not always treated with the same diffidence that the construction contractor is treated. Because of the openness of our contract we are often asked to perform work far beyond the normal requirements, and changes in administrative decisions become costly.

We have had no trouble in finding an adequate staff. Our top staff consists primarily of retired state highway department personnel. It includes two former chief engineers, three former deputy engineers and two former principal bridge engineers. Below that there is a principal working force. We have had a very low turnover and we do not seem to have any difficulty in obtaining additional personnel. As a matter of fact, we have had a recent run of persons requesting employment far beyond our means to absorb them.

One other problem which is presently acute is this question of high-speed computers. We do not feel that an organization such as ours is large enough to own or rent expensive universal-type computing equipment. I also do not feel that any outfit should be required to develop computer programs which are duplicates of computers which it is claimed are already developed. Unfortunately, while we have made considerable use of high-speed computers, we have attempted many others, only to find that the programs either have a lock



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"Trouble in Getting Plans Approved"

"Our principal difficulty with our highway engineering engagements," reports Arthur W. Consoer of Consoer, Townsend and Associates, consulting engineers, "has to do with that experienced in getting approvals of preliminary plans, intermediate plans, and final plans from state highway departments and, particularly, from the U. S. Bureau of Public Roads. The cost of our engineering work is much higher than it would be if these difficulties could be removed."

"On a number of our highway engagements we have suffered serious financial losses, and on others the profit has not been at all satisfactory, compared to what we are able to accomplish in other fields of engineering work."

"We find it particularly difficult to satisfy state highway departments and the U. S. Bureau of Public Roads on urban highway work. Much of that, in our opinion, develops from the fact that the engineers for the state highway departments and for the U. S. Bureau of Public Roads are not sufficiently acquainted with urban problems."



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and key on them or are designed for a single set of design criteria and are not sufficiently open to permit their use by us in any more than the one state for which they were arranged.

Consultant Opens Office in Ecuador

A firm of consulting engineers prominent in highway work, Rader and Associates, of Miami, Florida, has opened an office in Quito, Ecuador. The organization has a two to four year project there that will cost \$34.5 million for highway construction.

Testing Data Bulletin

A monthly 8-page bulletin entitled "The Testing World" is currently published by Soiltest Inc. Embodying news items and technical briefs on a wide range of subjects pertaining to testing, this bulletin is available free to engineers and contractors on request to Soiltest Inc., Suite 838, 60 East 42nd Street, New York 17, New York.

Concrete Pavement Awards

Concrete paving yardage awarded during the calendar year 1957 totalled 93,976,000 square yards, according to data from the Portland Cement Association.

This was divided 49.6 million square yards for roads, 29.9 million square yards for streets and alleys, and 14.4 million square yards for airports.

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INSTALLING SUBDRAINS

(Continued from page 98)

wash of a sand filter material. The sand used complied with the AASHO specification for concrete sand. It was purposely placed loosely so that the results obtained would be exaggerated and more easily compared.

These tests showed that the best position for the perforations is in the zone approximately 30 degrees down from the horizontal axis; also that practically no filter material entered with $\frac{3}{16}$ -in. holes. However, a noticeable quantity entered through both the $\frac{3}{8}$ -in. and $\frac{7}{8}$ -in. holes. The water was applied until the entrance of sand ceased. The tests also revealed that the flow capacity limitations were in the sand rather than in the perforations used in this test. As a result of these tests, Armco adopted the new perforation design. (See table "Standard Perforations for Hel-Cor Pipe")

Like other branches of engineering, subdrainage is largely common sense. After knowing the conditions, the drain can be designed for

Pounds of filter material per foot of pipe
washed into test drains of various types

PIPE	Perforations or Slots			Filter Material washed in pounds per ft. of pipe
	Size (In.)	No. Per Ft.	Location	
Porous concrete, bevel joints, sec. 2' long				0.01
Porous concrete, lap joints, sec. 1' long				0.03
Perf. corrugated metal pipe coated with tar, sec. 10' long, split collar couplings (perf. around $\frac{1}{2}$ periphery)	$\frac{3}{8}$ $\frac{3}{8}$	40 40	Down Up	0.03 0.2
Perf. concrete pipe, unsealed bell and spigot joints, sec. 2 $\frac{1}{2}$ ' long (perf. around entire periphery)	$\frac{3}{8}$ $\frac{3}{8}$	24 24	Down Up	1.3 2.3
Perforated clay pipe, unsealed bell and spigot joints, sec. 2' long (perf. around entire periphery)	$\frac{3}{8}$	30		3.7
Plain concrete pipe, unsealed bell and spigot joints, section 3' long				7.5
Semi-circular cradle invert clay pipe, $\frac{1}{2}$ " open slot on top, unsealed bell and spigot joint, sections 2' long	$\frac{1}{2}$ $\frac{1}{2}$		Top Top	8.4 test void

NOTE: The metal drainpipe was coated with tar which reduced the area of the perforations about 50 per cent. From technical Manual No. 183-1—U. S. Waterways Experiment Station.

best location, proper depth, proper trench bottom, and other factors to prevent damaging water from reaching the subgrade.

The developments on proper backfill are the most notable forward step in subdrain construction

in many years. It insures continued service of the drain, provided the infiltration area is properly designed.

Good subdrainage is still the best and cheapest insurance for modern highways.

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Cast-in-Place Piles For Toll Road Bridges

CAST-IN-PLACE metal shell piles are being used under most of the 285 bridges and overpass structures, being constructed during 1957 and 1958 for the Illinois Toll Road. These piles are in the form of 12 and 14 in. diameter by 0.179 wall spiral-weld foundation pipe, supplied by the L. B. Foster Company.

An example of the utilization of such shells is seen on Eric Bolander Construction Company's contract section T-18A. Here, the contractor encountered mostly dense clay, but also some silty sand as driving progressed. With nothing more than a flat closure plate to serve as a boot, the contractor drove as much as 1,500 lin. ft. of shell in ten hours. The pipe did not bend, buckle or

split, but gave a straight true pile. Bolander employed 26,000 ft. of 12 in. pipe for five bridges.

Driving was done with a 20-ton Bay City truck crane, swinging 35-ft. leads. An air-driven Union No. 1 hammer rode the leads, delivering 55 blows per inch for minimum bearing 30 to 35 tons, as specified. Pipe varied in length from 12 to 66 ft. Pipe longer than the leads was spliced on the job with a Lincoln welder.

Ready-mix concrete was chuted into the pipe, at rates up to 100 cu. yd. per day when conditions permitted.

The shells were fabricated from steel having in excess of 35,000 psi yield and a tensile strength of over

65,000 psi. According to data from L. B. Foster, the spiral-weld lap construction offers 12 percent greater collapse strength than a similar butt weld or seamless pipe. Pipe was delivered in one-piece lengths up to 70 ft. requiring a minimum of welding on the job.

Illinois Tolls To Be Collected Automatically

Automatic collection machines for the 187-mile Tollway are being installed for 23 toll lanes under a rental and installation contract. The award went to Electronic Signal Company of New York, with the machines to be manufactured in Chicago by Johnson Fare Box Company, a division of Bowser Pump Corporation. The rental is understood to be based on \$9 per lane per day, and the agreement provides for adding equipment up to a total of 40 lanes.

Diesel Pile Hammer Speeds Iowa Bridge Project

In a side-by-side test of a diesel pile hammer and a free-falling drop hammer, the diesel hammer drove steel piling seven times faster, according to the Hanson Construction Company, Washington, Iowa. The test was conducted on the site of the 1,240 by 24 ft. roadway under construction over the Des Moines River at Eldon, Iowa.

Lyle Wasson, Hanson's job superintendent, reported that the diesel pile hammer, a McKiernan-Terry DE-30, is a recent addition to the Hanson stable of heavy equipment and it was out on its first job. He put it to test, with the free-falling drop hammer, driving 10-in. 42 lb/ft Foster steel bearing piles in 6 of 14 piers being placed for the bridge. Each pier has seven pile bents.

The DE-30 drove the piles to a minimum depth of 20 ft. for the required bearing load of 32 tons in $3\frac{1}{2}$ to 4 minutes. Driving time for the free-falling drop hammer ranged from 26 to 30 minutes per pile. The DE-30 was mounted on a 11/4-yd. Lorain crawler with swinging leads on a 65-ft. boom.

• Pile shells delivered to the Illinois toll road and awaiting driving.



Highway Estimating Methods

By Geo. E. Deatherage, P. E.

Construction Consultant

Mr. Deatherage, author of this series on highway cost-keeping, has developed an 8-volume "Manual of Advanced Construction Management" for readers who are interested in more details of cost-keeping and the many related subjects in highway contracting business management. Please address your inquiry to George E. Deatherage and Son, P. O. Box 921, Lake Worth, Fla. Many contractors are finding this manual useful in a training course for superintendents and project managers. It is written primarily for these supervisory employees as an aid in better equipping them for taking on large responsibilities and improving their management techniques.

Estimating Unit Material Prices

OUR RECENT article on "Prevailing Wage Rates" covered the estimator's problem of determining the current hourly rate, including fringe benefits. We now approach that of determining the unit material prices to be used.

This function becomes much simplified if the Purchasing Department operates in the modern manner, maintaining an up-to-date "Material Cost Record" (an example form shown on the following page). Here, as is readily seen, a clerk can keep a chronological record of all purchases, a

separate sheet for each item. The estimator can then quickly note the best supplier and the lowest net unit price.

● More often than not the estimator will be forced to secure his own unit prices on materials by contacting the vendors. In this case, on a large job, he finds that to do this job thoroughly, it is not as simple as it appears, there being many angles to such an inquiry which will affect the price, as tabulated:

Check Questions in Figuring Material Bid Prices

1. Is the item described sufficiently and correctly?
2. Have we materials in stock or available from salvage that would do?
3. Approximately when will the materials be required?
4. Does the quantity required fit the usual production or distribution practice? (i.e.—standard packages, carton lots, carload lots, truck lots). Do we pay more for broken lots?
5. If we buy the larger and cheaper quantity can we use it on another job or profitably warehouse it?
6. Is this item a specialty for which some standard item may be substituted?
7. Can we fabricate it more economically ourselves?
8. Is there a cheaper product that can be substituted satisfactorily?
9. What particular qualities must the item have to fill its intended use?
10. Is the same item specified that was purchased for that use before?

11. If a different material is being specified, why is the change being made?
12. Are the required samples, prints or specifications available for securing the quotation?
13. Is the kind of material economically correct for the purpose?
14. What other qualities are available?
15. Can a better material be had?
16. If we use a substitute material, how serious will be the results of failure?
17. How much did the item cost before and from whom was it purchased?
18. If a lump sum is quoted, what is the unit price?
19. What transportation charges are there, if any?
20. Can the material be incorporated with other material to save freight, etc.?
21. Do samples need to be submitted for approval?
22. Does the status of the market indicate need of a contract, price protection or an option to contract?
23. What chances are there of a freight increase, government or state tax etc.?

MATERIAL COST RECORD
Geo. E. Deatherage & Son

Item											
DATE	W/P NO.	P/O NO.	SUPPLIER	NO. PCS	MATERIAL	UNIT PRICE	DISCOUNTS	NET UNIT PRICE	FREIGHT	FOB	REMARKS

24. What chances are there of a decrease in the above?

25. Is the market moderately well regulated or absolutely controlled?

26. Does the purchase justify a special study?

27. Does the chance of a price decline justify buying piecemeal against a large job, or the negotiation of coverage against a decline?

28. What are the terms of payment?

29. Are container charges being made and on what basis? (Rental, returnable or direct charges?)

30. If some equipment is rented, can payments apply to eventual purchase?

31. Is there any reason to justify special terms, such as "Final after 30 days installation and satisfactory operation"?

32. Is it to our advantage to buy F.O.B. destination, shipping point or freight allowed?

33. Should reciprocity enter into selection of the vendor? Would the owner approve?

34. Should more than the usual three prices be secured?

35. Should we look for a new source for this material?

36. Can we correlate this order with others to the same vendor?

37. Can we buy this item direct from manufacturer?

38. If buying through an agent, what is the reason for this?

39. Do we have a blanket order on this material? Should we have one?

40. Should the order be sent to the agent or direct to the supplier?

41. What are the discount terms?

42. Is the quantity large enough to warrant splitting the order to secure better delivery etc.?

43. Can we consolidate this order with similar material for another job and lower the price?

44. Will there be any inspection charges for quality etc.?

45. Are you sure you are getting prices from a reliable vendor?

46. Insist on a written price confirmation at once.

47. Can deliveries be made on time?

48. How long does it ordinarily take to secure the material?

49. Who is the closest reliable vendor to the job?

50. Should prices include insurance of any kind?

51. What is quantity desired for extra requirements?

52. Can you suggest a new combination of labor and materials to reduce costs over past practice?

53. Why buy the material at all? Can it be eliminated?

54. Does price include the erection drawings?

55. Do we have any stock of this item on hand that can be used?

56. Does the item weigh more or less than competitive one?

57. Are there any vendors that have a surplus or distressed stock on hand?

58. Have all available sources of supply been checked?

59. Will there be any charges for special handling?

60. Are you sure you are getting your money's worth and the best price all around?

61. Will there be any unloading or temporary storage charges at the site?

62. When arriving at the site, must provision be made to protect it from the weather?

63. What has to be done to the item before erecting it in place?

64. Does supplier furnish all accessories for erection?

The meticulous estimator should attempt to familiarize himself with all these listed factors which influence the material price, so that in the limited time he has, they are subconsciously weighed. An excellent way to remember most of the items is to personally make a written or typed copy of the list. This brings more of the five senses into play—a first class "remembering technique" for details.



• Thor muffle covers in use near Lambeth Bridge, London.

Noisy Paving Breakers Wear Sound Mufflers

For the John Mowlen & Co., Ltd., contracting firm, breaking up concrete 2½ ft. deep for new construction at the south end of Lambeth Bridge in London, England, was becoming costly and time-consuming. Because the noise disturbed workers in the adjacent British Ministry of Works, the paving breaking was limited to a few morning and evening hours. Then tests were conducted by Mowlen using Thor muffle covers on paving breakers. Noise was reduced 60 per cent and the contracting firm was allowed to go back on full daily schedule on its Lambeth Bridge and other London projects. Muffle covers are manufactured by Thor Power Tool Company, of Chicago, and reduce paving-breaker noise by replacing the loud, metallic sounds with soft thudding sounds.

High-Speed Cement Elevator Served Entire Texas Turnpike

A SINGLE CEMENT elevator played a major role in construction of Texas' first turnpike, a new 30-mile \$58,500,000 superhighway between Dallas and Fort Worth (opened to traffic August 27, 1957). This elevator, provided by Fort Worth Steel & Machinery Co., handled most of the cement used in the 448,300 cu. yd. of concrete in the turnpike's pavement and bridges.

It is believed to be the first such centralized use of a screw elevator. And according to the manufacturer the installation demonstrated several advantages over set-ups normally used to meet cement-handling needs of paving and building contractors and producers of ready-mix concrete, dry-mix concrete and concrete products.

The screw unit began service in August, 1956, at a railroad spur near the turnpike. The elevator, with 18-ft. lift, was fed by a 12-in. "Fort Worth Beeline" screw conveyor extending beneath the rail spur.

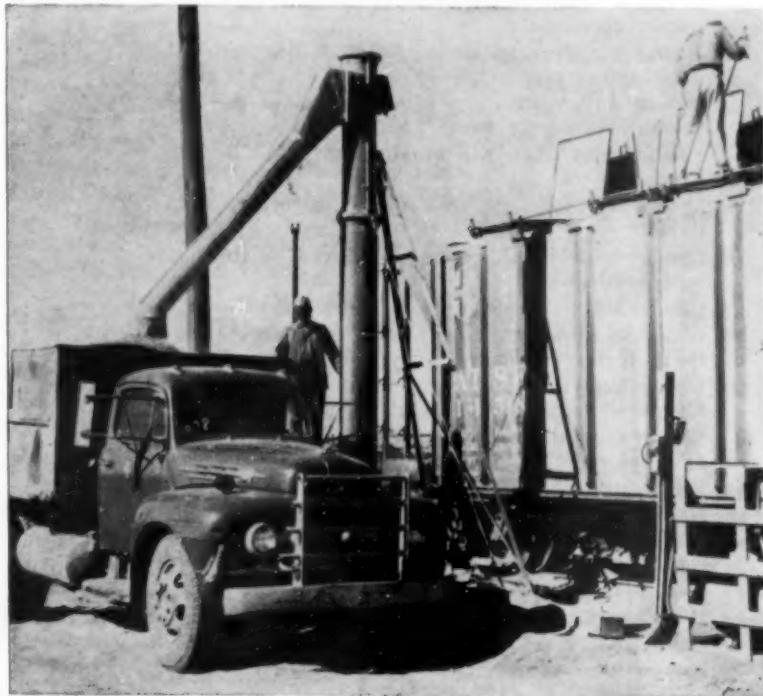
Discharging up to 150 tons of cement per hour, the elevator loaded a 40-barrel truck in three minutes for delivery to the paving site. By late July, 1957, when the turnpike

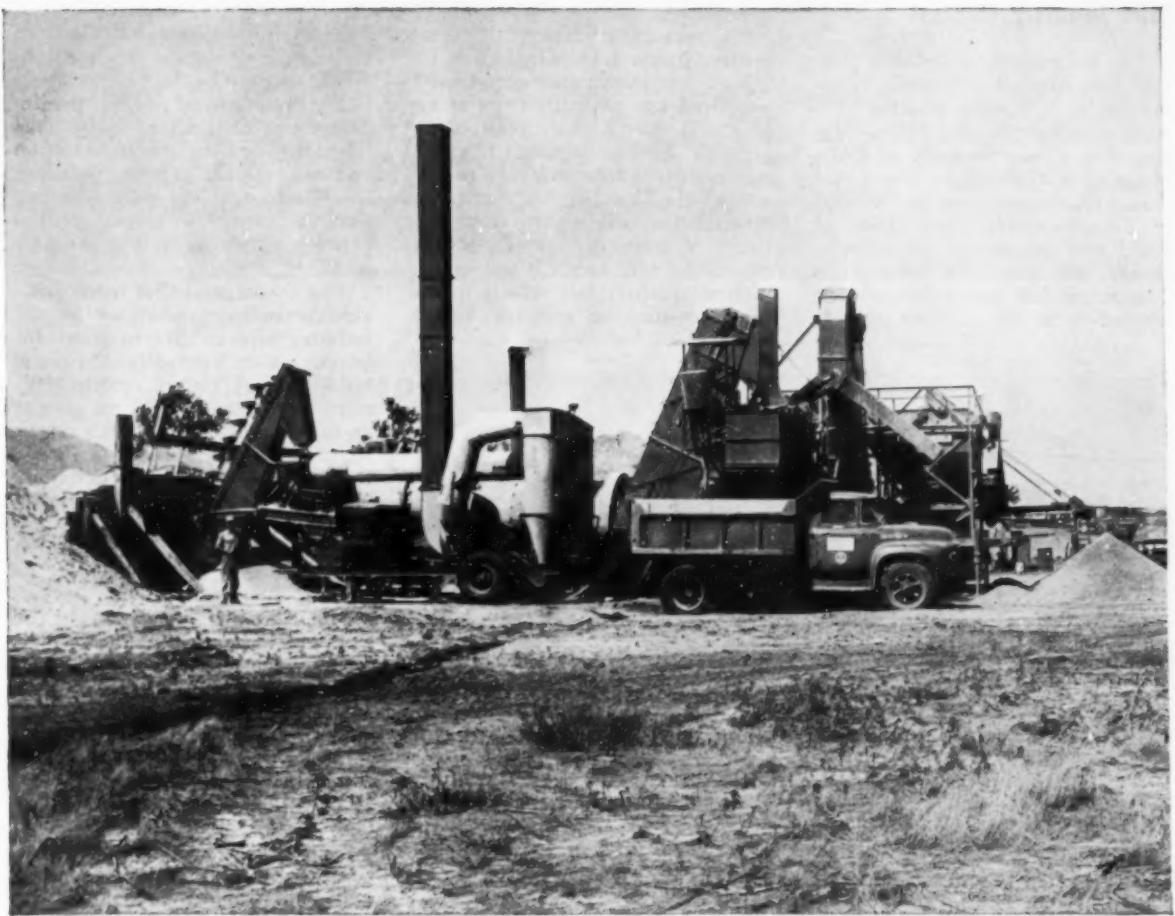
neared completion, the elevator had moved more than 700 carloads

(7,000 truckloads) of cement.

In addition to having only one-third the height, one-third the cost, and three times the capacity of a bucket elevator, the screw elevator has the advantage of portability, according to its makers. In three hours, three men were able to dismantle the screw elevator and have it en route to a new location.

• 150-ton-per-hour cement screw loading contractor's truck





Contractor George M. Myers reports: "Our Barber-Greene Model 845 Asphalt Plant averages 900 tons daily"**

This is the output of Mr. Myers' plant at its 21st location.

Changing job sites 21 times is a good record for any asphalt plant, but it is not unusual in a Barber-Greene Model 845. Even among Barber-Greene plants, the 845 is outstanding. It was specifically developed to achieve the utmost in portability and should not be confused with any other continuous plant. The dryer includes the hot elevator on the same chassis . . . the mixer has two-bin gradation unit included—these and other features contribute to its superior portability and performance.

Mr. Myers continues:

"We frequently move 100 miles or more . . . deliver an

average of 80 tons per hour* . . . maintenance to date has been routine . . . repair minor . . . operating costs low . . . with reasonable care there should be no limit to the life of our plant."

Like all Barber-Greene Continuous Plants, the Model 845 is inherently automatic as a result of the aggregate and bitumen feed being interlocked. The human element is removed, assuring uniform mix quality.

Barber-Greene offers a complete line of both continuous and BatchOmatic plants in any capacity to suit your needs. Write for full information.

*Rated capacity is 60-90 tons per hour.

Barber-Greene



AURORA, ILLINOIS, U.S.A.

56-26-A

CONVEYORS... LOADERS... DITCHERS... ASPHALT PAVING EQUIPMENT

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Asphalt Cement Committee Stirs Industry Interest

The Committee on Quality Control of Asphalt Cement, chairmen by J. Rogers Martin, engineer-manager of the Hot Mix Asphaltic Concrete Assn. of Oklahoma gave a report to the Third Annual Convention of the National Bituminous Concrete Assn. in Las Vegas this month. As noted in *Roads and Streets* in March, this committee has recommended the upgrading at the earliest possible

date of that small portion of the total asphalt produced which the committee contends is substandard.

To comment further on this committee, it has acknowledged in its report that the quality of asphalts produced has generally been excellent and that asphalt refiners, in general, have contributed much money to research in order to improve the quality of asphalts. Nevertheless, the report continues, there is naturally *some* asphalt offered for sale which is not of the highest quality, but which qualifies, and must be accepted, under

present day, wide-open specifications. It is largely for the purpose of upgrading this small portion of the total production that the need for more stringent specifications arises, they said.

The Committee offered the industry two methods of getting the job done—one, by the formulation and enforcement of more stringent specifications at the public agency level, or, two, by raising of the existing standards by the industry itself.

The report said that many individuals and organizations in the industry felt an urgent need for improving or upgrading the durability of *some* asphalt cements currently being marketed, and gave as an example of this support a recent statement of the Bureau of Public Roads: "The Bureau is definitely sympathetic to the idea that quality requirements (of asphalt) are needed and should be included in specifications."

Floor discussion by delegates following the convention report by the Committee, was active and showed member's enthusiasm over the recommendations. Martin's Committee was highly complimented by delegates for its thorough and forthright approach to the problem.

Following full discussion of the report, delegates directed the president of the association to appoint a committee of contractors to continue this study on quality control of bituminous materials.

NBCA members may obtain a copy of the full report of the "Committee on Quality Control of Asphalt Cement" by writing the national office of the association in Washington, D. C., Room 218, 1145 19th Street, N. W.



Look at the uniform triple-lap coverage and straight edges you get with a "Black-Topper"

You can see the results of Etnyre's exclusive triple-lap coverage (spray from each nozzle overlapping *two* other sprays) in the unretouched photograph above. Road builders have learned that single-lap coverage is utterly unsatisfactory . . . double-lap coverage somewhat better . . . but triple-lap coverage is the complete answer to hitting rough aggregate from all possible angles for complete coverage.

Moreover, by turning the end nozzle as indicated, you get a sharp line edge which adds the finishing touch to the job. With this accurate alignment, you can spray right up to the edge of curbs. Such dependable operation and uniform, accurate distribution are typical results you can expect from an Etnyre. Investigate today — find out how soon a "Black-Topper" can be delivered to you to handle your work faster, better, more economically!

E. D. Etnyre & Co., Oregon, Illinois

SEE YOUR ETNYRE DEALER

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS

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New Appointments

DENNY F. WARNOCK, Cincinnati, Ohio, has been appointed mid-western sales and service specialist on Eimco Model 105 tractor by Eimco Corp., Salt Lake City, Utah. He has been assigned to the Chicago regional office at Palatine, Ill.

PAUL J. EVERY has been appointed managing director of the Cummins Engine Co., Inc., subsidiary in Shotts, Lanarkshire, Scotland. Mr. Every had been general sales manager at the parent plant at Columbus, Ind., before being appointed to his new position in Scotland.

Bituminous ROADS AND STREETS

Survey Points Way to

Better "Slurry Seal" Applications

Careful control of aggregate, emulsified asphalt and water by weight or volume, are among the recommendations given new emphasis as a result of a state-wide study of this maintenance technique.

By **Carl E. Neill**

Staff Engineer,
American Bitumuls & Asphalt
Company

IMPROVED METHODS for obtaining greater efficiency and economy in the use of "Slurry Sealing" for pavement maintenance was recently brought to light as the result of a survey conducted throughout California.

The survey was made by research and field engineers of American

Bitumuls & Asphalt Co. in conjunction with technical staffs of slurry-seal users. Included in the state-wide study were three airport jobs, ten state highway, five county, and 25 city projects. All projects selected had been in use for one to two years, in order that accurate observations could be made concerning the durability of the slurry seal under varied conditions.

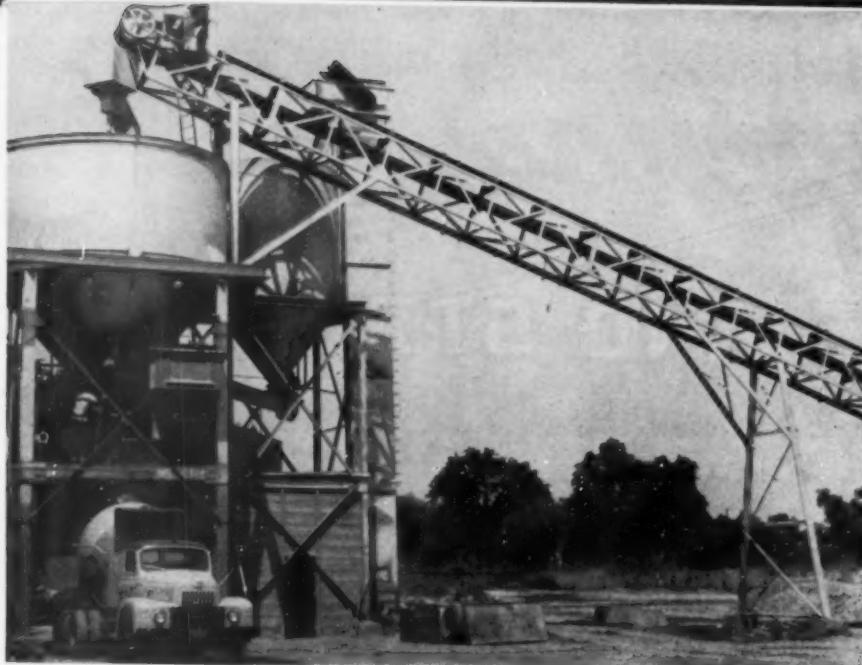
Basically, the slurry-sealing technique consists of a light application of a mixture of fine aggregate, bitumuls emulsified asphalt and



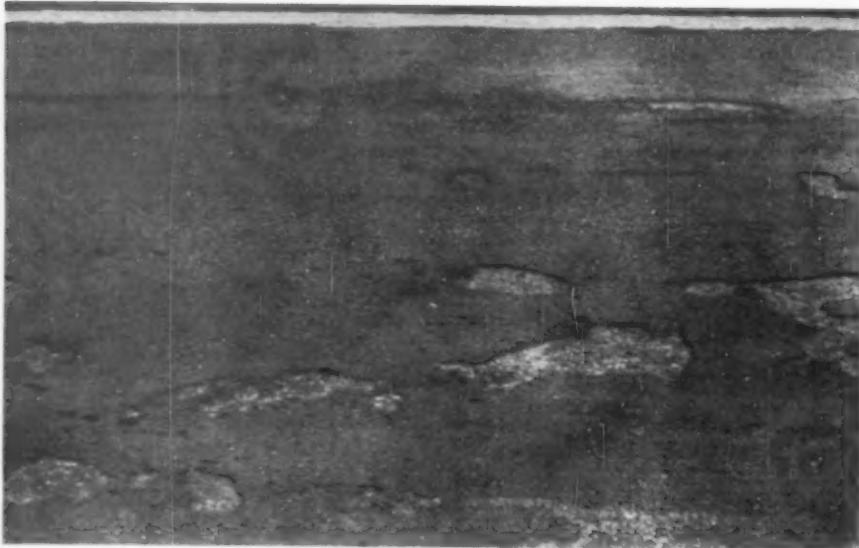
Carl E. Neill

• Rich slurry seal holds up under heavy traffic on U.S. 66 east of Los Angeles.





• Typical batching of slurry-seal aggregate into transit-mix truck is shown in operation at Visalia, Calif. This city is a major user of the slurry-seal technique.



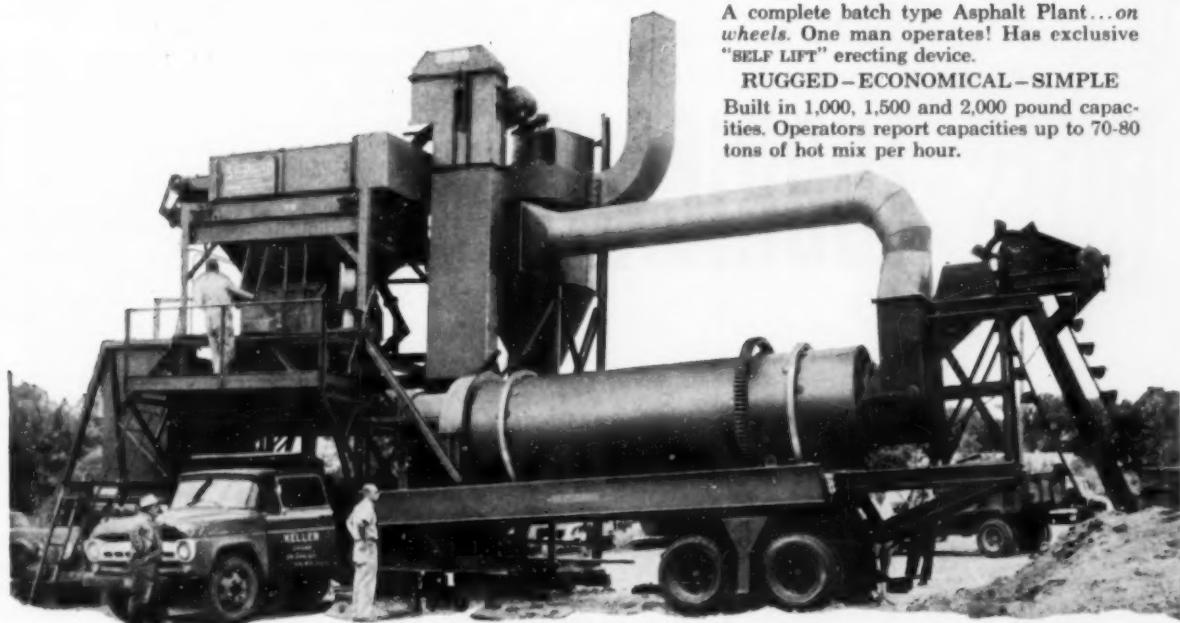
• Slurry seal lost bond on this pavement which was not properly cleaned and prepared in advance.



• Conventional slurry-seal operation. Slurry is chuted from transit-mix truck to spreader-box for one-pass application. Result is a fast, lowcost method of filling mass cracks and voids.

THE STANDARD **T-M*** IS RUGGED

—Goes Everywhere a Truck Goes!



on the job...



on the way...

STANDARD

built to do a better job!

TM

ASPHALT PLANTS

A complete batch type Asphalt Plant...on wheels. One man operates! Has exclusive "SELF LIFT" erecting device.

RUGGED—ECONOMICAL—SIMPLE

Built in 1,000, 1,500 and 2,000 pound capacities. Operators report capacities up to 70-80 tons of hot mix per hour.

* STANDARD Model T-M *Trailer Mounted* asphalt plants offer the same rugged design features as the larger STANDARD Model R-M semi-portable asphalt plants, including: Super-Lift Dryer with Saw-Tooth Lifters... Hi-Speed Mixer, Heavy Duty Design... Simplex Pushbutton Batching Control... positive control of liquid asphalt, and complete accessibility... with everything mounted and packaged in its own rugged trailer frame. Field proven for a number of years, the Model T-M is designed for extreme portability and top capacity.

The massive Standard Model T-M *Trailer Mounted Asphalt Plant* is the contractor's answer for on-the-job mixing in rural areas and remote locations. Push button erection. Complete plant can be set up and started in less than 8 hours. Here's the toughest, largest, most economical *Trailer Mounted Asphalt Plant* in the world.

STANDARD STEEL CORPORATION

General Offices & Plant, 5003 Boyle Avenue, Los Angeles 58, California

Midwest Offices & Plant **LEADER IRON WORKS** Decatur 3, Illinois

(Division of Standard Steel Corporation)

ROTARY DRYERS • KILNS • COOLERS • ASPHALT PLANTS

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"FINEST PERFORMANCE FOR 56 YEARS!
WE'LL STAY WITH STANDARD"



ON-THE-SPOT

*technical service,
products that never fail*

keep Palumbo Excavating Company buying STANDARD

FUELS and LUBRICANTS



Putting Expressways Together. Excavating for interchange joining three major Chicago-area expressways, the Palumbo Company is moving 472,000 cubic yards of earth. Here are Peter A. Palumbo, John L. Bugatto of Standard Oil and Charles Bohac, general superintendent for Palumbo. John prepared for the technical advice he gives on jobs like this by obtaining an engineering degree at the University of Illinois. He has also completed Standard's Sales Engineering School.

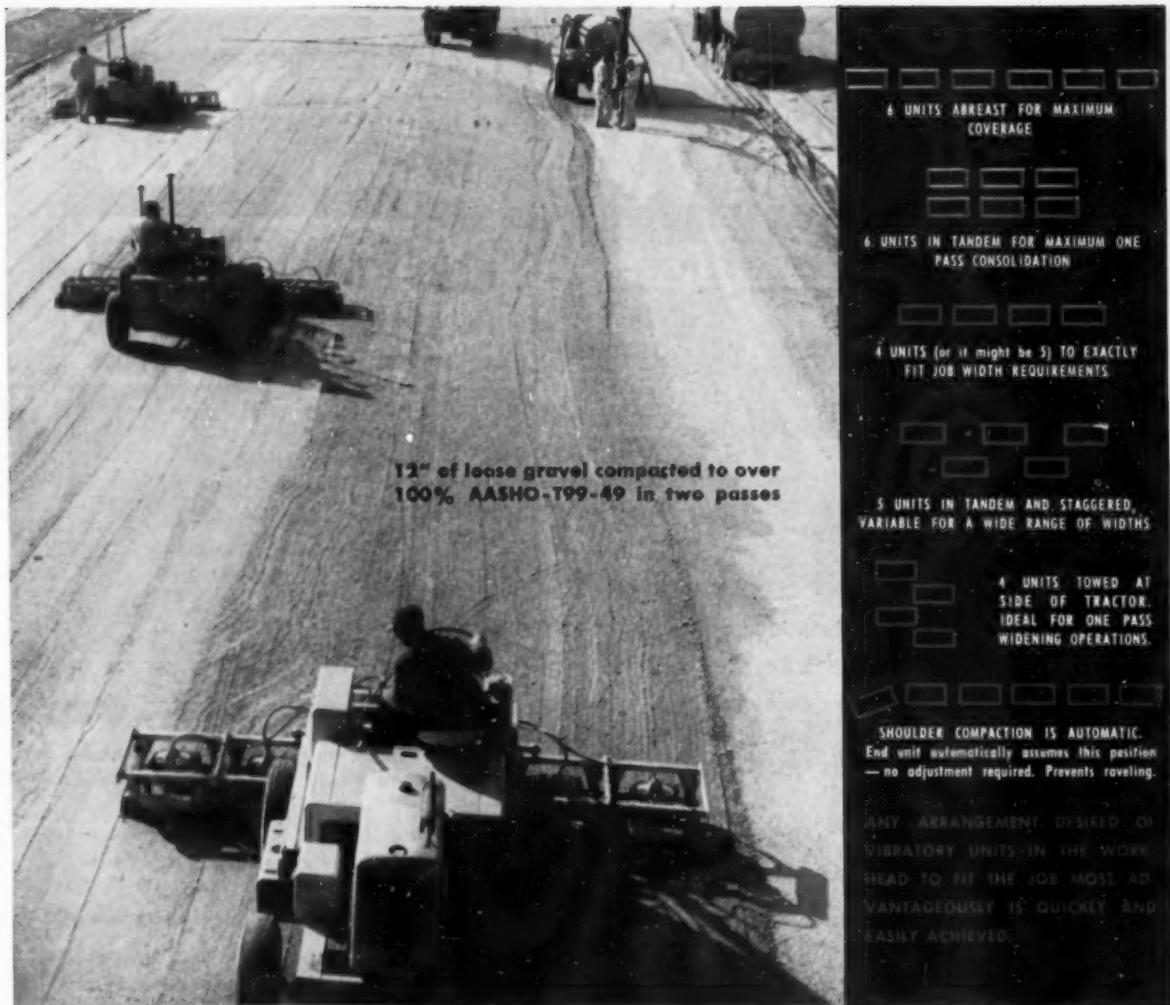
YOU EXPECT MORE FROM **STANDARD** AND GET IT!



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Motor-minded Palumbos: Fourth generation, Joey and Sam, Peter Palumbo's sons, riding in their motor-driven car, hand-built by their dad. In background is one of the company's heavy-duty trucks used at the expressway project. Standard Oil fuels and lubricants keep the Palumbo equipment dependably on the go.





JACKSON COMPACTORS

**MORE OF THEM USED ON
AMERICAN TURNPIKE
PROJECTS THAN ALL
OTHER PAN-TYPE
COMPACTORS COMBINED!**

The reason is two-fold. 1. The JACKSON, with its tremendously powerful vibratory action, provides 100% of specified density of any material normally used in macadam base or sub-base courses in the shortest possible time. Each unit in the workhead supplies 4200 THREE-TON BLOWS per minute. 2. IT'S FAR MORE VERSATILE THAN ANY OTHER COMPACTOR, ideally adjustable to each and every job requirement. Coverage is what you want it to be, up to 13', 3". Any arrangement of the compactor units, as indicated at right, is quickly attainable. With this machine you can compact areas others can't touch, a factor that eliminates lost motion and saves a great deal of time and money. And, of course, it is equally effective on all types of granular soil fills and similar projects. By all means inspect it at your Jackson distributor.

AND FOR SPOTS OTHERS CAN'T REACH

Any of the compacting units in the Jackson Vibratory Compactor workhead can be fitted with steering handle and used exactly like the nationally renowned Jackson Manually Guided Compactors. Perfect for getting into odd spaces and close to walls, etc., spots that can't be reached by other equipment. One man with a twin hook-up to two of these units will compact up to 1,200 sq. yds. of granular soils in 6" layers per hour.



FOR SALE OR RENT
AT YOUR JACKSON DISTRIBUTOR
— name and descriptive
literature sent on request.

JACKSON VIBRATORS, INC.
LUDINGTON • MICHIGAN

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WE'LL STAY WITH STANDARD"



ON-THE-SPOT

*technical service,
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keep Palumbo Excavating Company buying STANDARD

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YOU EXPECT MORE FROM **STANDARD** AND GET IT!



In 1901 Joseph Palumbo found that Standard Oil lubricants worked best to keep the horse-drawn wagons rolling smoothly. Later, in 1920, his son Samuel Palumbo founded Palumbo Excavating Company. For 56 years Standard has satisfied the company's every petroleum need.

Peter A. Palumbo, general manager of the company and grandson of its founder, tells why: "Standard's products are superior. The service is 100% . . . anywhere we have a job. We've never experienced delays from Standard Oil; I have confidence in the name Standard."

For instance, on the project pictured on this page, as on all its jobs, Palumbo has found that Standard provides the right combination to keep equipment constantly on the job: **STANOLUBE HD-M** Motor Oil and the technical know-how supplied by Standard Oil automotive lubrication specialists.

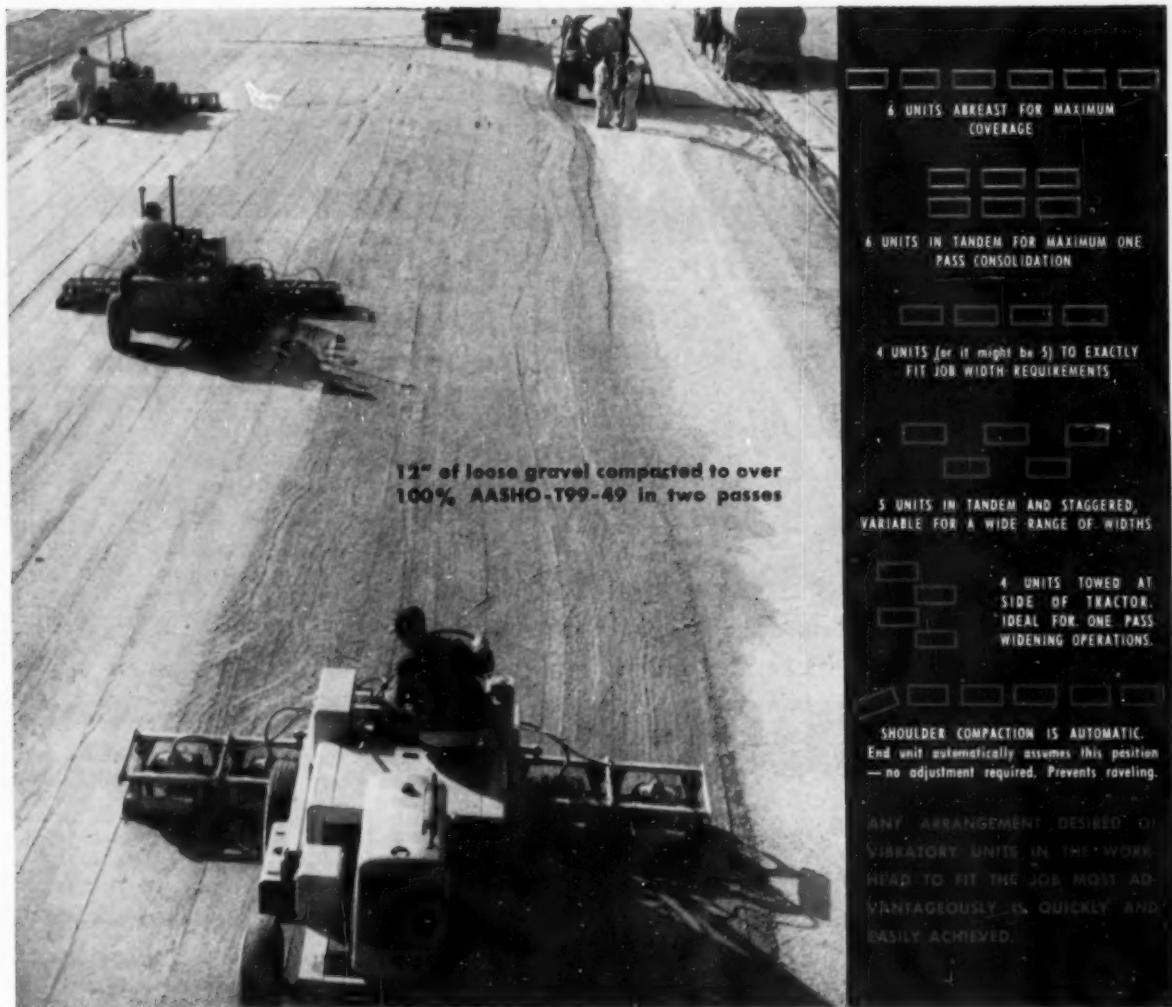
STANOLUBE HD-M gives superior service under grueling conditions. It is refined from highest-quality base stock. As a result of Standard Oil research, **STANOLUBE HD-M** is formulated with an additive that prevents bronze wrist-pin bushing corrosion. Other additives retard oil oxidation, minimize formation of piston ring deposits, prevent formation of excessive varnish and sludge and prevent corrosive attack on bearing metals. Standard's trained specialists spend hours on the job site to make sure equipment is never down for lack of fuel, lubrication or service.

This dependable combination—highest-quality products, promptly delivered, and skilled technical service—can be yours, too, anywhere in the 15 Midwest or Rocky Mountain states. Call your nearest Standard Oil office. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

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Motor-minded Palumbos: Fourth generation. Joey and Sam, Peter Palumbo's sons, riding in their motor-driven car, hand-built by their dad. In background is one of the company's heavy-duty trucks used at the expressway project. Standard Oil fuels and lubricants keep the Palumbo equipment dependably on the go.





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literature sent on request.

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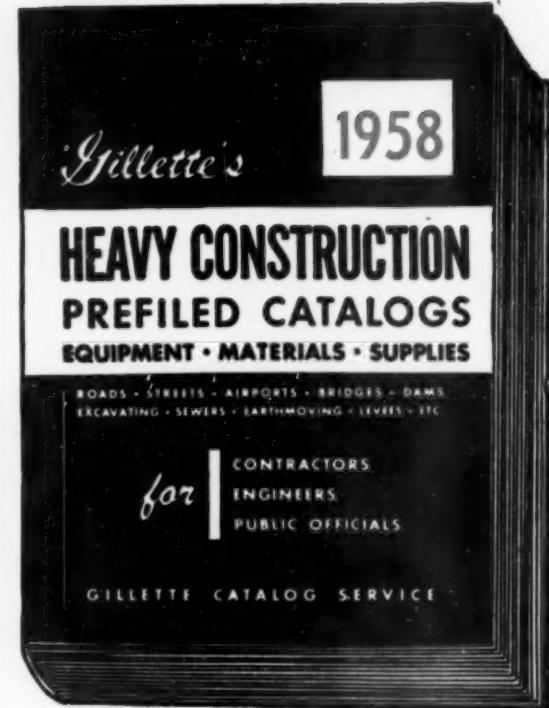
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After checking the advantages listed above, you can see why this ONE CATALOG offers you so MANY advantages . . . saving you both time and money, not only in the mechanical and physical aspects of a cataloging operation . . . BUT MOST IMPORTANT OF ALL . . . it is available WHEN you NEED it . . . BEFORE you make your buying decisions! The manufacturers represented in this catalog are literally 'meeting' with you in your office — offering you all the information you could possibly need concerning their products. Why not meet them at least half way — and USE THEIR PREFILED INFORMATION!



Here are the manufacturers represented in
Gillette's Heavy Construction Prefiled Catalog:

American Steel & Wire	Jackson Vibrators, Inc.
Arms Drainage & Metal Products, Inc.	Joy Manufacturing Company
Austin-Western	Miller-Tilt-Top Trailer Company
Baldwin-Lima-Hamilton Corporation	Minneapolis-Moline Company
Barber-Greene Company	Neugatuck Chemical Div.
Browning Manufacturing Company	Onan & Sons, Inc., D. W.
Corey Manufacturing Company,	Owen Bucket Company, The
The Philip	Phoenix Products Company
Chrysler Corporation, Industrial Engine Div.	Pioneer Engineering
Clark Industries	Pressite-Keystone Company
Cleaver-Brooks Company	Republic Steel Corporation
Cleveland Form Grader Co., The	Rogers Brothers Corporation
Cleveland Trencher Co., The	Rogers Dozer Rippers
Colorado Fuel & Iron Corp., The	Seaman-Andwall Corporation
Continental Motors Corporation	Seaman-Gunnison Corporation
Cummer & Son Co., The F. D.	Serviced Products Corp.
Detroit Diesel Engine Div.	Shawnee Mfg. Co., Inc.
Erie Strayer Company	Stow Manufacturing Co.
Flexible Road Joint Co., The	Symons Clamp & Manufacturing Co.
Gar-Bro Manufacturing Co.	Timken Roller Bearing Co., The
General Motors Corp.	Toncan Culvert Manufacturers Association
Giedhill Road Machinery Company, The	United States Rubber Company
Harnischfeger Corporation	United States Steel Corp.
Heitzel Steel Form & Iron Co., The	Universal Form Clamp Company
Huber-Warco Company, The	Waukesha Motor Company
	Williams Form Engineering Corp.

SLURRY SEAL

(Continued from page 184)

crete overlay. The slurry will, however, serve to fill cracks and voids and thereby reduce the transfer of cracks.

Some shrinkage can be expected in large cracks. Due to the squeegee action wiping the high spots, only a thin film of slurry seal is left. This wears away in a short period of time under traffic. The pavement will then have a mottled appearance where the high spots have been worn clean. But the cracks and voids will remain filled. When rich enough in binder content, some mixtures have held up well under light residential traffic over good pavements such as those consisting of oil mat road mixes.

"Slurry-Sealing" with emulsified asphalt is also effective in filling the fine cracks and void spaces that will occur in most airport surfaces. These cracks are primarily due to lack of traffic kneading and recompacting of the pavement. The slurry seal has been shown to be particularly useful on airport surfaces, in developing a clean, dense surface and protecting against the effects of weathering on the original sound asphaltic concrete pavement. In addition, slurry seals reduce loose surface material to a minimum, thus guarding against damage to expensive aircraft, particularly those with jet intakes.

Necessary Precautions

Among the necessary precautions to be taken in the use of slurry-sealing is the preparation of the old pavement surface. Generally speaking, power-brooming of the pavement is required, and, if possible, the pavement should be thoroughly washed to eliminate loose material. Vegetation should be removed from all cracks and the cracks then blown out with compressed air. One airport included in the survey used a dilute-Bitumuls emulsified asphalt tack coat, designed to overcome the absorption of the old pavement and insure adequate retention of the slurry seal. The tack coat was applied at a dilution of 1 part emulsified asphalt to 3 parts water by a conventional asphalt distributor. A drag broom was connected to the rear of the distributor to work the tack coat into the old surface. This technique was considered valuable for airport, highway and street pavements.



with a **ROSCO**

That's a photo of Francis Willette of the Willette Excavating Co. blacktopping the 8300 sq. yd. parking lot of the Dunwoody Institute in Minneapolis. His Rosco MODEL RHU MAINTENANCE DISTRIBUTOR is making money on every job. Quick to start and get going, the RHU is designed for economical bituminous maintenance and limited construction. It has many of the features required by contractors . . . as well as municipalities. For driveways, alleys, streets, parking lots, shoulders, re-shaping curves, patching, sealing and a host of other jobs . . . Model RHU will get YOU "into the profit picture". Check the money-making features with your Rosco dealer. He'll show you what Model RHU can do for you. 800 to 1000 gallon capacity.



2-Wheel Model RMT Maintenance Unit with front mounted heaters and rear mounted pump and engine is available in 400, 500 or 600 gallon sizes.

ROSCO ASPHALT KETTLES

Used by contractors, highway departments, roofers and waterproofer for heating and melting all types of bituminous materials. Two-pass heating system, ruggedly built. Capacity 2, 3 or 4 barrels.



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CALIFORNIA SLURRY SEAL SURVEY

Location	1	2	3	4	5	6	7	8	9	10
Sample Information:										
Sieve Analysis:										
Passing No.	4	100%	99%	100%	92%	98%	88%	97%	97%	100%
8	98	98	88	82	83	70	96	85	87	90
16	81	96	61	62	74	53	77	65	61	55
30	66	86	44	45	63	41	51	52	43	40
50	24	45	25	24	39	26	21	32	22	27
100	10	21	14	12	21	15	7	13	10	14
200	8	12	9	7	10	9	3	6	6	6
Emulsified Asphalt Represented from Extraction										
	17.6%	18.1%	14.5%	17.6%	12.6%	23.3%	20.2%	19.3%	13.3%	14.7%
Emulsified Asphalt Required for Abrasion Value - 100										
	14%	27%	18%	18%	16%	16%	Not recommended	12%	13.5%	15%
Aggregate Composition										
	90% Coarse Sand, 10% Dark Silt	Sand Silt	50% Sand 50% Cr. Dust	Same as No. 3	50% Sand, 50% Cr. Dust	Same as No. 5	Sand, No Fines	50% Sand 50% Cr. Dust	Same as No. 6	Cr. Dust
Type of Traffic										
	Street	Jet Aircraft	Street	Street	Street	Heavy Hwy.	Street	Street	Light Planes	Jet Aircraft
Condition of Slurry After One Year										
	Almost all worn off, some surface voids filled.	Worn off completely.	Worn off, high spots, cracks filled.	Entire surface remains.	Slurry worn off, high spots, some areas.	Uniform, covers all areas.	Worn off, high spots voids filled loose sand.	Most of surface covered cracks and voids filled.	All areas covered.	Tack Coated areas covered without tack coat some scabbing. Mix segregated.
General Appearance										
	Very poor	Very poor	Poor	Good	Poor	Excellent	Fair	Good	Good	Good

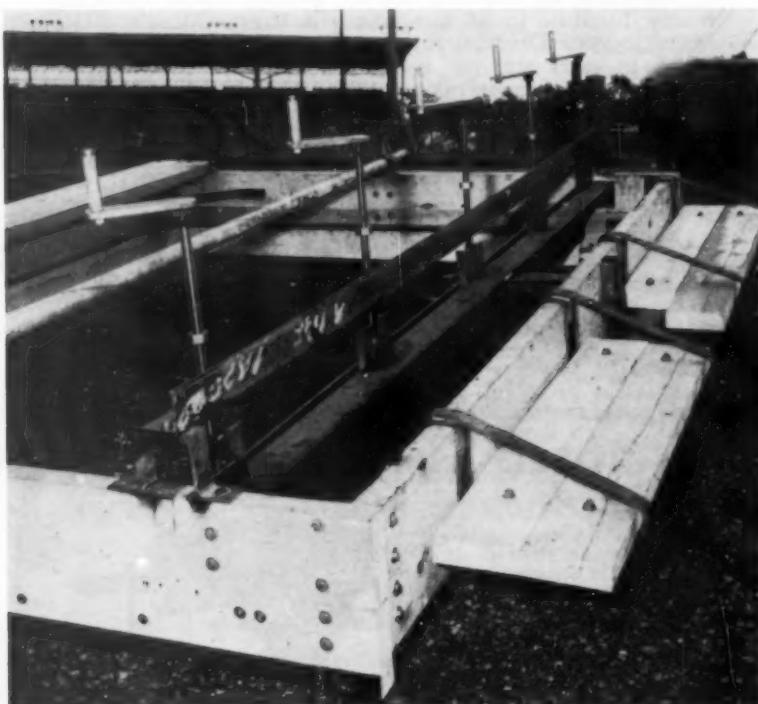
NOTES: Nos. 1 and 2 illustrate poor results when silty fines are used. Nos. 3 and 4 illustrate same aggregates with different quantities of Emulsified Asphalt resulting in failure or success. Nos. 5 and 6 illustrate same as Nos. 3 and 4. No. 7 illustrated failure due to lack of fines. Nos. 8, 9, and 10 illustrate successful jobs with well-graded aggregate with crusher dust fines.

Preparation and measurement of the slurry-seal aggregate are two more important factors requiring close control, according to the survey. All successful jobs studied employed crusher-run dust, generally blended with clean, washed sand

of the plaster type. Fines (material passing the 200 sieve) made up of silts, clays and other natural occurring materials did not prove successful in actual use. When loss of slurry seal took place, it could be traced either to water action dis-

integrating the mix, or balling of the fines, producing a non-uniform texture to the finished surface.

Graduation analysis in practically all successful jobs showed all material passing a No. 4 sieve and 5 to 15 percent material passing the 200-mesh sieve. Material containing uniformly-graded proportions between the 4 and 200 mesh apparently were the easiest to handle with a minimum of segregation.



- Typical slurry seal drag box is rectangular in shape, simply constructed and features an adjustable squeegee of neoprene rubber mounted two-thirds of the way back. Other types use such innovations as spray bar placed across box to dampen the pavement, wheels which can be lowered for rapid transit.

AMERICAN CIVIL ENGINEERING PRACTICE, Vol. III by Robert W. Abbott. 6 x 9. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. Price \$25.00.

This voluminous reference containing over 1000 pages and many illustrations is a companion to Volumes I and II in the series. Representing the compilation of the large staff under the direction of Robert Abbott, partner in Tippett - Abbott - McCarthy - Stratton, Consulting Engineers, the volume comprises 13 sections. These sections cover theory of structures, masonry and plain concrete, reinforced concrete, prestressed concrete structures, footings, piers and abutments, retaining walls, steel bridges, concrete bridges, buildings, miscellaneous concrete structures and foundations, timber structures, earthquake resistant dams.

With the Manufacturers
and Distributors



Lindsay Gets the "Oscar"

Dealers Honor Ken Lindsay

Dealers for Iowa Manufacturing Company turned the tables on Kenneth Lindsay, Sr., executive vice president for that company, when they awarded him an "Oscar" at the annual dealer meeting in Chicago in January.

Regularly at this meeting Lindsay awards an "Oscar" to the dealer who has made the greatest sales effort in promoting Cedarapids equipment during the past year. This time the honor went to A. E. Finley & Associates, Inc., of Raleigh, N. C., but then the meeting was interrupted by G. W. Van Keppel of G. W. Van Keppel Equipment Co., Kansas City, Mo., with the surprise on Ken which had been initiated and planned entirely by the dealers.

Lindsay's "Oscar" consisted of a briefcase containing a plaque reading "Oscar Winner Kenneth Lindsay Awarded by all the Dealers of the Iowa Manufacturing Company in recognition of the Great Service He Has Done For Them and For His Untiring Efforts to Promote the Welfare of the Industry." With it were a congratulatory letter from each dealer and two tickets for a Caribbean cruise, which Mr. and Mrs. Lindsay planned to use on a March vacation.

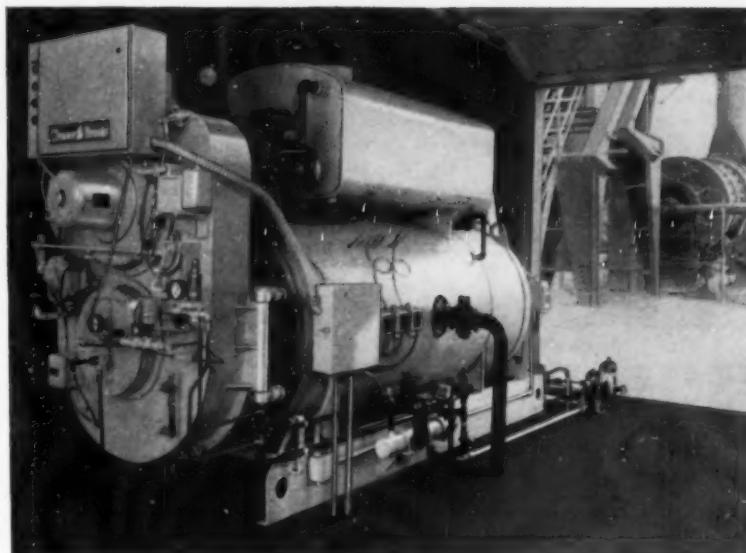
EDWARD A. MURRAY has been named assistant vice president of sales of American Steel and Wire Division of U. S. Steel Corp. His headquarters will be in Cleveland.

CLARK EQUIPMENT Co. has appointed Donald C. Feys, 32430 Dohany Drive, Farmington, Mich., as special field representative for Northeastern U. S. and Canada.

ERLINDER EQUIPMENT CORPORATION, 12221 S. Indiana Ave., Chicago, Ill., has been appointed Chicago-area distributor by Daybrook Hydraulic Division, Young Spring & Wire Corp., Bowling Green, Ohio.

(Continued on page 194)

New PEAK-TEMP forced-circulation uses high-temperature oil



Heats bitumens twice as fast as 150 lbs. steam!

New Peak-Temp *forced-circulation* oil heater does away with costly high pressure steam lines, valves, boilers. Heated high-flash-point oils circulate, raise and maintain bitumens and heavy viscous materials to application temperatures—increasing at the rate of 25 to 30° per hour. That's about twice as fast as with 150 lbs. of steam.

- Operates at atmospheric pressure—minimum attention and maintenance.
- Completely automatic—fully equipped with advanced operating and safety controls. Quiet, smokeless.
- Forged circulation provides uniform heat distribution. No carbon build-up or coking.
- Circulating oil lasts indefinitely—won't freeze in spring and fall operation.
- No refractory in furnace to replace or maintain. No stack.
- Heats oil to 450° F. without special pumps and fittings.

Versatile — easily adapted to heating a variety of viscous materials such as plastics, residuals. Handy for quick drying of forms used with cast prestressed concrete structural members. Completely fiber glass insulated and metal-jacketed.

For complete details write for Bulletin C-11. Cleaver-Brooks Company, Road Machinery Division, Dept. D, 395 E. Keefe Ave., Milwaukee 12, Wis.

Cleaver  **Brooks®**

ORIGINATORS OF THE SELF-CONTAINED BOILER



CB BOILER—15 to 200 hp. Oil, gas and combination oil/gas-fired.



PORTABLE STEAMER—50 to 125 hp, trailer and skid-mounted.



PEAK-TEMP OIL BOOSTER—Skid-mounted. Easily transported.



PORTABLE PUMPING BOOSTER—Has self-contained oil and gas tanks.

... for more details circle 259 on enclosed return postal card

Another Record?

92-Mile Haul for Plant Mix

A PROBABLE RECORD for the state of California was chalked up this past summer when the firm of Clements & Company successfully operated a haul of 92 miles in carrying plant mix to a paving site. The company, whose plant is near

Hatfield on state route 210 close to the Oregon line, had a contract for the surfacing of 7.9 miles of state route 28 near Cedarville, 92 miles to the southeast. It was determined that moving the plant in and out would boost unit costs on the 9,000

tons of mix needed, so a long distance haul schedule was mapped out.

Fifteen to 17 four-axle bottom-dump trailers, of the over-the-road type, hauling in tandem, carried about 25 tons of mix and made two trips a day per each tandem outfit. It took the loaded units about three hours to make the run. The plant operated from 4:30 a.m. to 2:30 p.m., and this trip schedule was able to take care of the daily production of about 750 tons.

When the bottom-dump units were pulled in ahead of the paver, the front unit was spotted over a windrow sizing box. When the gates were opened, they fell into the box and engaged it so that it was pulled ahead when the vehicle moved. After the front unit was emptied, the rear unit was pulled ahead and emptied the same way.

Spreader Box

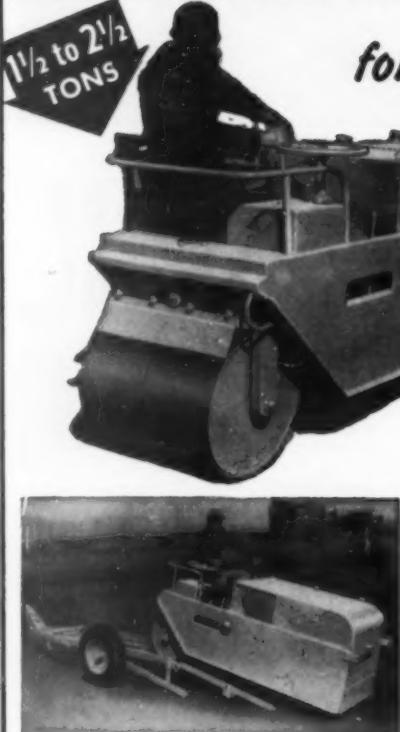
The spreader box ran on runners and was attached to the bottom-dump truck and was set to make a windrow that contained the proper amount for a uniform thickness required. The additional material was placed where necessary to build up low shoulders and uneven spots in the roadbed. This was only done on the leveling course.

Several factors influenced the company's decision not to move its plant. It had been set up and was operating on a large and tested aggregate deposit, while satisfactory aggregate was not available near the job site. It was felt, besides, that the tonnage on the contract would have had to be larger to justify moving the plant. Clements executives had also planned—and rightly, as it turned out—on a sizable reduction of hauling costs by using the bottom-dumps in tandem hauling.

Furthermore, the company had an arrangement to supply mix to another contractor for work on a location close to the Hatfield plant. There were other prospects also, for work within range of the Hatfield location.

The contract was under the supervision of District II of the California division of Highways at Redding, with H. S. Miles, district engineer, Ray Wilson, district construction engineer on this project, and W. H. Bartlett, resident engineer. John R. Holgate was superintendent for Clements & Company.

Standard Steel MODEL 55 Tandem Roller



for ECONOMY...
SPEED

BUILT LIKE
THE BIG ONES
▼
PERFORMS LIKE
THE BIG ONES

Provides FLUSH CURB Rolling on Each Side

THE MODEL 55 ROLLER was designed to provide two important advantages: (1) Adequate compaction for patch rolling requirements and (2) Ideal roll dimensions for smoothing and finishing work. Ballasting is evenly distributed through the use of both steel and water ballast. Steel ballast is removable in 70# sections providing a wide choice of compaction ranges.

The Model 55 will roll to within 2 inches of wall or building on driver's side and to 4 1/2 inches on opposite side. Eight inch ground clearance provides flush rolling adjacent to curbing. Automotive steering makes easy driving. Upholstered seat, safety seat rail, speed control, throttle and foot brake are of motor-car type—and water valve is in easy reach of operator. The maximum weight with all ballast is 4600#. Shipping weight is 3600#. Speed—from 1.75 MPH to 3.5 MPH.

TRAILERIZED FOR EASY TRAVEL FROM JOB TO JOB

Photo above shows ease with which roller is loaded and unloaded from trailer. One man can easily lift and hook it to towing vehicle.

●
Loading Ramp becomes end gate. Roller locks on trailer for safe travel at all speeds. Write for FREE Catalog and Prices.



Standard Steel Works, Inc., NORTH KANSAS CITY, MO.

... for more details circle 326 on enclosed return postal card



Photo Courtesy
American Hereford Association

there
is a
**LITTLE
BULL...**

in most all advertisements
of construction machinery—
particularly Asphalt Plants

 If you will review some trade journals, you will learn that practically every make
of every type of construction machinery on the market is the most dependable, the most
durable and economical, the fastest producing, and the most accurate.



but here is a
GOOD STEER

An asphalt plant, "a lifetime investment," is too
important to buy on "sales talk" . . . in advertisements
or by salesmen.

To get the facts about all makes of asphalt plants,
talk to the men who own them and the men who
run them.

Any Simplicity Plant or Simplicity Plant Owner will
do a much better job of convincing you that Simplicity
is the very best, than all the "bull" our advertising
agency can write or our salesmen can shoot.

But to justify the expense of this ad we must still
"shoot the bull" by saying Simplicity is the most de-
pendable, durable and economical asphalt plant ever
built—the finest money can buy.

**THE SIMPLICITY
SYSTEM COMPANY**
DIV. OF WEST CONSTR. CO.

RIVERSIDE DRIVE
CHATTANOOGA, TENNESSEE

P.S. Write us for location of the Simplicity Plant nearest you.
See it in operation; talk to the men who run it!

. . . for more details circle 325 on enclosed return postal card



• Asphalt sealing at 28 to 30 degrees F. Picture was taken two weeks after job was laid. Conventional asphalt seal in foreground shows ridging and excessive loss of chips. Husky's rubberized asphalt, used in the background, shows very satisfactory retention of chips and good uniformity of surface. Note shadow-line cast by extra thickness of chip coat retained by rubberized asphalt.

Rubberized Asphalt Tested for Winter Seal

HUSKY Oil Company announces that it is conducting tests with rubberized asphalt to determine the practicability of seal coating streets and highways during cold weather.

Roland Vokac, Technical Services Director for Husky, reports that experimental sealing tests were made on several blocks of streets in Cody, Wyoming, December 19, 1957. Temperatures of 28 to 35 degrees F prevailed during the construction. Normally, seal coating of streets and highways is not undertaken when the air temperature in the shade is below 50 degrees F.

Discussing the tests, Vokac said, "Full results will not be known until the advent of warm weather. However, preliminary examinations

of the test sections where rubberized asphalt was applied shows the resulting surface to be highly satisfactory." Vokac added that "comparative test sections where conventional asphalt seal was used already show undesirable ridging and other signs of progressive failure."

Husky's rubberized product, which has high low-temperature ductility and superior adhesive qualities, has proved highly successful over the past four years in the seal coating of streets, highways, and airport runways in eight states. Preliminary results of the December 19 low-temperature application indicate that use of the product may allow for extension of highway sealing operations to include the cold weather of

early spring and late fall.

The City of Cody, Taggart Construction Company, and Husky cooperated in putting down the Cody test surfaces.

With the Manufacturers and Distributors

(Continued from page 191)

EDWARD W. FLAMME has been appointed district sales manager of the Portland, Oregon district sales office of the Reo Division of The White Motor Co.

RALPH E. KEIDEL, manager of advertising and sales promotion for Euclid Division of General Motors, Cleveland, was elected General Chairman of Construction Equipment Advertisers at a recent meeting of the association in Chicago. He succeeds M. B. Jaeger of Bucyrus-Erie Co.

THOR POWER TOOL Co., Prudential Plaza, Chicago, has announced the appointment of William J. McGraw as general sales manager, Walter G. Mitchell, as general manager of product development, and Milton E. Slater as sales manager of farm and ranch division.

(more on next page)

SWENSON SPREADERS *Speed Sealcoating!*

Spreads Salt or Chloride for DUST CONTROL or SOIL STABILIZATION

write for complete information

SWENSON SPREADER & MFG. CO.

Lindenwood, Illinois

... for more details circle 327 on enclosed return postal card

KWIK MIX CO. (a division of Koehring Co.), Port Washington, Wis., has named the following distributors for territories adjacent to or near their respective headquarters: Contractors Supply Co., 410 S. Dean St., Englewood, N.J.; R & R Equipment Co., 35, Route 22, Hillside, N.J.; R. H. Machinery, Inc., 2923 W. Superior St., Duluth, Minn.; The Olsen Equipment Co., 4411 Hiawatha Ave., Minneapolis, Minn.; Industrial and Foundry Supply Co., Inc., 2500 Union St., Oakland, Calif.; Malcolm G. Stevens, 78 Summer St., Arlington 74, Mass.

ROBERT A. BEVER, with wide experience in the heavy equipment export field, has been appointed export sales representative for R. G. LeTourneau Inc., of Longview, Texas.

BUCYRUS ERIE CO., South Milwaukee, Wis., has appointed Lewis C. Black assistant general sales manager in charge of sales of large machines and blast hole drills. He had been sales manager-large machines.

THE CONSTRUCTION MACHINERY DIV. of Clark Equipment Company has announced the appointment of Ralph Hall as field service representative for the "Michigan" line in Pa., Ohio, Va., West Va. and Kentucky.

PROPOSED PLANS for merger of Dresser Industries, Inc., Dallas, Texas and Gardner-Denver Co., Quincy, Ill., have been abandoned.

J. W. (JACK) HARDESTY has been appointed General Manager—Sales of the Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio. Howard W. Read was named manager of parts and service and William Lutes as parts sales manager.

MINNEAPOLIS-MOLINE CO. has named E. A. Henry as manager of the newly organized industrial sales department. Traveling district representatives to handle wholesale operations in major geographical areas centered on their own headquarters and reporting directly to Henry at the home office are: Thomas G. Gafka, Columbus, Ohio; and Harold Bradshaw, Minneapolis, Minn.

In the other localities, the firm's branch offices will handle industrial sales under the general supervision of the home office.

CHAIN BELT COMPANY acquired the designs and rights to manufacture and sell the "Quad-City Slip Form Paver" on December 1, 1957. The machine was developed about three years ago by the Quad-City Construction Company, paving contractors of Rock Island, Ill.



PAVING PROFITS GO UP WHEN YOU USE

OVERMAN'S STONE AND BITUMINOUS SPREADER

You can do fast, high-quality paving with this small, compact, low cost machine. Lays any type commercial asphalt. Easily handled on small jobs, highly efficient on the largest job. A proven money-maker for contractors and highway departments everywhere.

Get the facts . . . write for descriptive bulletin today.

I. J. OVERMAN MANUFACTURING CO.
BOX 896 MARION, INDIANA

... for more details circle 314 on enclosed return postal card

L-20 White ASPHALT PLANT PAYS FOR ITSELF IN 38 DAYS!*

* \$13,900 F.O.B. Elkhart is price of portable model illustrated. Stationary model, \$13,400 F.O.B. Complete, ready to operate. Prices subject to change without notice.



Make your own hot mix asphalt with this new WHITE plant and save up to \$2.30 a ton. At its capacity of 160 tons an 8-hour day, that's a savings of \$368.00 a day. Thirty-eight of those days pays for the L-20!

Produce any type mix you can get from a \$100,000 plant: hot, RC, MC, SC and emulsified for top

course, base course, one course, or patch. Two men operate. Capacity is rated at a hot 325 degrees.

The L-20 will supply black-top for suburban streets, driveways, parking lots, school yards, or state highway maintenance.

See your nearest distributor or write direct for full information.

White Manufacturing Company, Elkhart 2, Indiana

... for more details circle 340 on enclosed return postal card



Kansas Highway Commission in New Offices

The state highway commission of Kansas has a new home in the recently completed \$9 million state office building in Topeka. The commission has 60,000 sq. ft. of office space on the 7th, 8th and 9th floors.

Firestone Salesmen Attend School in Trailers



Four red and white 35-ft. trailers, fitted with seats accommodating 24 students each, have replaced the 14 district schools which Firestone Tire and Rubber Co. maintained for the training of sales personnel. Each unit makes about 90 stops a year, covering 15,000 miles and serving 3 to 15 states. Classes are held both evening and daytime. The trailers are driven by the instructors who have complete responsibility for the units as well as for the teaching.

One Shipment: 500 Tons of Bridge Flooring

Ten carloads of Greulich 4-way grid bridge flooring recently left Kerrigan Iron Works, Nashville, for the Lowry Street bridge across the Mississippi River at Minneapolis. The shipment is said to be the largest single consignment of steel products ever to leave Nashville.



CLEARING HOUSE SECTION

FOR SALE

LATE MODELS MIDWEST LOCATIONS
Manitowoc 3000-B's, 3500's erect cranes—
shovels, long booms, wide long cars—
diesels. Also 2000-B's.
Northwest 6's, 80-D's, and 85 cranes—drags
—shovels, diesels, wide long cars—long
booms. Ind. BH's.
Bucyrus-Erie 38-B's, 51-B's, 54-B's, cranes—
drags, shovels, diesels, wide long cars—
long booms.
Marion, Koehring, Link Belt & Lorain model
cranes—drags—shovels, wide long cars—
—diesels. Also backhoe equipped mu-
chines, all types.

JAMES C. FRENCH

P. O. Box 188
228 Berry Pkwy. - Talcott 3-4927
PARK RIDGE, ILLINOIS

THOR POWER TOOL CO., Chicago, has announced appointment of Walter B. Smith as district sales manager in Milwaukee. Other current appointments are: Theodore E. (Gene) Vocker, branch manager at St. Louis; and five new district sales managers as follows—Harry L. Groves, Houston; Martin A. Bertram, Cincinnati; Samuel P. Gartland, Boston; Thomas J. Murphy, Buffalo; and James A. Golden, Atlanta.

EDWARD EHRBAR, INC., distributors of International Harvester construction equipment, Lorain power shovels and cranes and Hough "Payloaders," has opened a new plant in Pelham Manor, N.Y. The company's territory is metropolitan New York—13 counties in lower New York state and 14 counties in northern New Jersey.

THOR POWER TOOL COMPANY announces that William J. Miller will supervise its construction equipment division sales for the western half of the United States and Canada and Elmer R. Stitt will handle similar duties for the eastern Thor territories.

Principles of Administration

The principles of administration and supervision in highway practice were reviewed recently in the series of four three-hour meetings, sponsored jointly by the Engineering Extension, University of California, and the California division of highways. Held February 28, and on successive weeks at Marysville, California, these meetings covered various aspects of job management, personnel, and related subjects.

For report material from the meetings address Harmer E. Davis, Professor of Civil Engineering and Director of the Institute of Transportation and Traffic Engineering, University of California, Berkeley, California.

HELP WANTED

SALES REPRESENTATIVES or dealers wanted to sell concrete saw blades direct to road-builders and general contractors. Tremendous repeat sales . . . high commissions . . . provide an exceptional opportunity if you are now selling to concrete paving contractors. Submit complete data including territory covered. All replies confidential.

BOX 1199, ROADS & STREETS, 22 W. Maple St., Chicago 10, Ill.

MANUFACTURERS REPRESENTATIVES

Currently soliciting municipalities.

Opportunities open to sell additional items. Choice territories are now available. Write Box 1201, stating experience, territory, service, and any lines presently handled too.

WANTED DISTRIBUTORS

Territory in most states available
For sale of Steel Forms, Sidewalk, Curb,
Curb and Gutter, accessories and keyway
joints.

MASTER FORM

11823 Williamson
Cleveland 7, Ohio
Phone Lakewood 13228

ENGINEERS — FOREMEN — OFFICE MEN
Learn latest methods to organize and
run work. Prepare for the top jobs.
Send post card for details.

GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

Used Tournapulls

LeTourneau (C) Roadster Tournapull with GM-671 engine, 2400 x 25 24-ply tires on tractor, 2100 x 25 tires on scraper. Late model. Excellent condition and buy.

LeTourneau (C) Tournomatic Tournapull with GM-671 engine, 2100 x 25 tires, torque converter. Late '55 model. A-1 condition.

LeTourneau Super (C) Tournadozer with GM-671 engine, 2100 x 25 tires, torque converter, down pressure on dozer.

THE GEO. T. RYAN CO.

171 27th Ave. S.E.
Minneapolis 14, Minn.
FRanklin 1-7981
Hibbing, Minn. W. Highway 169
AMherst 3-6895

ROADS AND STREETS, April, 1958

CLEARING HOUSE SECTION

SHOVELS, CRANES & HOES

Insley "K-12" 1/2 yd. Dragline or Trench Hoe, Reconditioned . . .	\$ 6,250
Marion "331" 3/4 yd. Used Shovel or Dragline	\$ 6,500
Byers "B3" 3/4 yd. Used Dragline, 40' Boom	\$ 5,750

TRACTORS & LOADERS

Caterpillar "D-4" Diesel Tractor w/Traxcavator Hydraulic Front End Loader. Rebuilt engine & tracks	\$ 6,500
Terra Trac "500" Front End Loader, hydraulic scarifier, like new. \$ 4,500	
Allis-Chalmers "TLW" Used Trac- tor w/Tractomotive Front End Loader, 3/4 yard	\$ 2,000
International "TD9" Diesel Tractor w/Bucyrus-Erie Dozer-Loader. \$ 3,000	

TRANSIT MIXERS

Rex 1/2 Yd. Adjusta-Wate Moto- Mixer, Chrysler power, open end, very clean	\$ 3,000
Rex 3 Yd. Hi-Discharge (4 1/4 yd. Agitator) 1950 model, Mounted Chev. 6400 Tandem axle truck \$ 3,000	
Jaeger 3 Yd. Hi-Discharge (4 1/4 yd. Agitator) repaired, blasted & painted. Un-mounted	\$ 1,000
Jaeger 4 1/2 Yd. Hi-Discharge (6 yd. Agitator) mounted LF174 Tan- dem	\$ 2,650
Jaeger 4 1/2 Yd. Hi-Discharge (6 yd. Agitator) mounted I-H LF190 tandem axle truck	\$ 5,000

MISCELLANEOUS

Universal "1824" R.B. Jaw Crush- er, rebuilt 1956	\$ 3,500
Universal "916" R. B. Jaw Crush- er	\$ 750
Grundler Port. Pulverizing Plant, 3x8 Feeder, 3x8 mill, discharge conveyor, G-M 671 Diesel power, 8 months old	\$ 22,000
Dixie Port. Pulverizing Plant, 3x8 feeder, 3x8 Iowa screen, 3036 mill, discharge conveyor, GM- 671 Diesel power, completely overhauled	\$ 24,000
Universal Port. Pulverizing Plant; #5 Pulverizer, Murphy ME-66 diesel power, Simplicity 4x8 screen, 36" discharge conveyor, 24" side delivery conveyor, front dolly, tandem rear axles	\$ 24,000
Leland 20-Ton Lowboy Drop Deck Tandem Axle Semi Trailer	\$ 2,250
Pettibone-Wood "820A" New Windrow Proportioner, reduced for quick sale.	
Pettibone-Wood "P620" Used Preparer. G-M Diesel power. Will rent or sell.	

NOTE: All this equipment located in our yard.

120 S. Pierpont Phone 4-6706

EIGHMY EQUIPMENT COMPANY

ROCKFORD, ILLINOIS

OUR YARD

ANOTHER BARGAIN
NORTHWEST MODEL No. 25
EXTRA ATTACHMENTS
SHOVEL FRONT 3/4 YD. DIPPER
PULL SHOVEL FRONT 3/4 YD.
DIPPER
CRANE BOOM 30 FT—10 FT.
EXTENSIONS
PULLSHOVELS
UNIT MODEL 614 S/N 50315 1/2
YD. CAT.
SARGENT S/N 10330 MOUNTED
STERLING TRUCK 3/8 YD.
SHIELDS BANTAM S/N 1736
MOUNTED 6 x 6 GMC TRUCK
3/8 YD.

**Donald B. MacNeal,
Inc.**

12100 S. Loomis St.
Chicago 43, Ill.
PULLMAN 5-5040

FOR SALE

One 34E dual drum Koehring paver in
good condition \$12,000
Two two cu. yd. Smith mixers. Each 250
One 28" by 66" Asphalt dryer 3,500
One Clarage 1317 fan used only 250
hours (64" wheel) 1,800
One American Blower fan, 50" wheel 450
One American Blower high pressure
blower with fluid drive and Hauck
758 combination oil and gas burner.
This burner operates on 1/2 gas pres-
sure. 60 hp. electric motor included 1,200

WANTED

One 4 by 10' Robbins vibrex screen with two
decks. One 150 hp. electric motor at 1200
rpm. Also starter 220 volt. One 100 hp. electric
motor at 1800 rpm. Also starter 220 volt.
Jeffrey vibrator feeders capacity fifty tons to
two hundred per hr.

TYLER READY-MIX CONCRETE AND ASPHALT CO.

P. O. Box 1046
End of East Bow Street
Tyler, Texas

NOW AVAILABLE FOR SALE OR RENT

Good Used Contractors Machinery

AT A SUBSTANTIAL SAVING

4—Caterpillar Model 12 8T Series Motor Grader.
 1—Bucyrus-Erie 54-B Dragline.
 1—Northwest Model 6 Combination Pull Shovel Dragline.
 1—Northwest Model 6 Combination Shovel Dragline.
 1—Northwest Model 25 Dragline.
 1—Bucyrus Erie 22-B Dragline.
 1—Northwest 25-ton Moto-Crane.
 1—Lorain MC 254-W Moto-Crane.
 3—Cat. D-8 Dozers.
 5—Cat D7 w/cable Dozer.
 1—AC HD-21 w/push plate.
 4—Cat D-W-21 Motor Scrapers.
 1—LeTourneau LS Scraper.

4—Euclid Model 43FDT—13 Yd. Bottom Dumps.
 1—Blaw-Knox 20-25' Concrete Spreader.
 2—Buffalo-Springfield 10-14 Ton 3-wheel Rollers.
 2—60" Double Drum Sheepfoot Rollers.
 2—Ferguson 50-ton Pneumatic Tired Rollers.
 1—Towner Disc Flow.
 2—IH Model 1-9 rubber-tired Tractors.
 5—9-wheel Pneumatic Tired Rollers.
 2—CH & E-6" Centrifugal Pumps.
 1—Madsen 4,000 lb. Asphalt Plant complete.
 1—Standard 4000 lb. Asphalt Plant complete.
 1—Cleveland Form Grader.
 1—Lincoln 300 Amp. Welder.
 1—Gardner-Denver 365 Diesel Compressor.
 1—Ingersoll-Rand 105 Gasoline Compressor.

MILLER C. BEASLEY MACHINERY CO.

2015 N. Industrial

P. O. Box 5266

DALLAS, TEXAS

Phone: RI 2-2907 - Night RI 2-6101

EQUIPMENT FOR SALE

16—LeTourneau Super C Tournapulls, HB600 Cummins Diesel LP Scrapers
 2—TD24 w/push block and DDP Units
 1—HD19 Rebuilt, w/push block, S/N 1124
 2—TD18 w/push block and DDP Units
 1—RD8 w/push block and DDP Unit
 1—RD8 w/root rake and tree pusher
 1—HD14 new HD15 engine, DDP Unit
 1—HD14 w/Gar Wood Scraper, model 515, Cable 13 to 15 yd.
 1—HD14 w/dozer and Heil C16 Scraper
 2—Bucyrus Erie S152 Scrapers, 13½ cu. yd.
 1—HD19 track rail
 1—Low-Boy Cross Model DF6T, 25 ton
 1—GMC 750 tractor w/5th wheel and Tulsa winch
 1—Koehring 16E DDP complete with engine, gear and meters
 1—Johnson Weigh Batcher complete on mobile gear w/low bin trolley
 1—Baughman Bulk Material Silo with 915H auger assembly and vertical screw
 1—Model F600 Ford with Baughman cement tank body
 1—Car Unloader including hopper 20' horizontal auger, Syntren US5 electric vibrator
 Trucks Mixers, all sizes
 1—1½ yd. material handling bucket, Owens type 5
 —½ yd. Blaw-Knox Model H, Clamshell with teeth

All Equipment Located in St. Louis County, Mo.
 Subject to prior sale

WES THOMAS

1640 Quenda VOLUNTEER 3-1443
 ST. LOUIS 14, MISSOURI

For Sale

(1) 1950 LORAIN 80 SHOVEL

1½ Yd. Bucket

This machine has hardly done any work.
 It has 4,399 hours on the clock. S/N 19735. Purchased new.

(2) 1950 MACK DUMPERS

with 165 H.P. Cummins Diesel Engines.
 These engines were completely rebuilt by the Cummins people about a year ago.

(1) 1950 D-6 CATERPILLAR BULLDOZER

In very good condition, the Crawler is perfect.

MARCHIONE BROS., EXCAVATORS, INC.

579 E. N. Y. Ave., Brooklyn, N. Y.
 PR. 3-5704

FOR SALE

LIMA—Model 703
 1½ Yd. Standard Shovel, Cat. D337 Diesel with Torque Converter. New April, 1957.

ANDERSON EQUIPMENT COMPANY
 P. O. Box 427, Bridgeville, Pa.
 Phone: LEligh 1-6020

FOR SALE

CRANES

1—UNIT "614" ½ yd. Backhoe (New).
 1—BUCYRUS-ERIE 37-B ½ yd. Dragline with 85 ft. Boom, D-13000. Cat. Engine, Fairleads & Tagline Winder.

TRACTORS

1—TERRATRAC "600" 1 yd. Loader, power shift trans. (rebuilt).
 1—TERRATRAC "600" 1 yd. Loader (new).
 1—TERRATRAC "320" Crawler, with ½ yd. Loader (New).

2—CASE "320" Wheel Tractors, w/Case Ladders & Backhoes.

1—TERRATRAC GT-34 ¾ yd. Loader Tractor.

1—FORD Tractor-Backhoe and Loader.
 1—CAT D7 with 7-5 Dozer and Cat #25 P.C.U. NEW RAILS AND PADS. Rollers, sprockets and idlers excellent. Final Drive Good. **THIS IS AN EXCELLENT MACHINE**—over \$4,700.00 in repairs put into it.

MISCELLANEOUS

1—WOOLDRIDGE Scraper, 12-15 yd. Good.
 1—NEW CLEVELAND FORM GRADER "POWER ROLL"—1 TON CAPACITY.

1—TANDEM AXLE TILT TOP TRAILER—8 ton.

8—USED AIR COMPRESSORS—ALL SIZES.

2—REX 6 yd. Mixers on I.H. tandem trucks.

2—JAEGER Mixer 6 yd. on I.H. tandem trucks.

MOTOR GRADERS

1—CAT #12—Excellent Condition.
 1—ADAMS 305—Good Condition.

WERCKLE

CONSTRUCTION EQUIPMENT COMPANY

718 Miller Ave.
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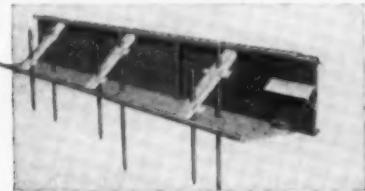
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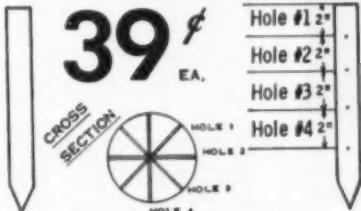
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PRETESTING STEEL IS ONE WAY MATCHLESS QUALITY IS ASSURED IN GENUINE CATERPILLAR PARTS

Careful selection of material gives greater strength to new D8 strutless track links

Quality doesn't just happen. The world-famous quality that is the hallmark of Caterpillar earthmoving equipment is a direct result of never-ending research, the finest possible materials, and persistent attention to every manufacturing detail. This is true of Caterpillar machines. And it is true of Caterpillar parts.

The new, strutless link for Cat D8 Diesel Tractors is an example of this emphasis on quality. Each link is able to bear the entire weight of the tractor, over and over again, in the roughest of terrains and climates. This is how Caterpillar makes sure these links meet this challenge:

All steel used for links is given an extensive series of tests *before* manufacture. In the Caterpillar Metallurgical Laboratory it is first analyzed for chemical composition by a spectrograph—slight variances in chemical make-up can result in big differences in the finished product. Then the steel is tested for hardenability; in

other words, the degree to which it will respond to heat treating. Resistance to impact loads is measured to insure the track link will give maxi-

best way to make a link. Forgings are more dense. They have "inner flow lines"—the equivalent of grain in wood—following the contour of the part, providing greater strength at critical locations as well as resistance to breakage.

"Dubbed-off" link ends eliminate damage to rollers and mating links. Strategic designing of steel into the bushing boss and arch improves fatigue strength. Links are *double* heat treated, furnace heated for a tough core, and "Hi-Electro" hardened for a deep, superhard rail surface.

Features like these mean one thing. A Caterpillar part is your best buy. Your Caterpillar Dealer has full information on the new D8 strutless links and the other quality Cat parts. See him today.

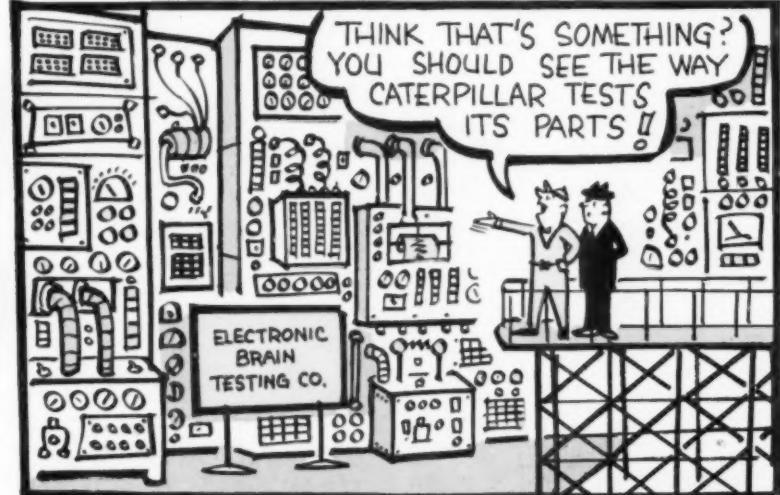
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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LINK STRENGTH is measured on this hydraulic press. The design of Caterpillar track parts is under constant examination by the most extensive research facilities in the industry.



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Pressure distributor applies hot Texaco Asphalt to 3-inch compacted layer broken stone, forming upper course foundation.

Asphalt's important role on

new Connecticut Turnpike



Hot-mix Texaco Asphaltic Concrete wearing surface was laid in two courses with combined thickness of 3½ inches.

These contractors paved a large mileage of the Connecticut Turnpike with Texaco Asphalt:

L. G. DeFelice & Son
D. V. Frione
M. A. Cammino Const. Co.
Guyott Company
Lane Construction Co.

The 129-mile Connecticut Turnpike, newest American toll road, links New York State and Rhode Island. Asphalt was called upon to play a varied, as well as a leading, part in the construction of this important expressway.

Asphalt Pavement: 69 miles of the turnpike have a 3½-inch hot-mix Asphaltic Concrete surface on a 3-inch Asphalt Penetration Macadam base. Supporting the asphalt portion of the pavement is a 4-inch course of dry-bound macadam with sand filler, over an 11 to 23 inch gravel subbase.

Asphalt Shoulders: Either hot-mix Asphaltic Concrete or Asphalt Penetration Macadam shoulders were constructed for the full length of the toll road.

Asphalt Curb: This turnpike is another example of the use of asphalt to provide durable, economical curbing.

Selected for many of the nation's modern, heavily traveled turnpikes, asphalt also is the logical pavement for the 41,000-mile Interstate Highway System. It combines rugged durability under heaviest traffic loads, unequalled riding comfort because of its resilient, joint-free surface, with a substantial saving in first cost—plus other important advantages.

Texaco Asphalt, used in paving a large mileage of the Connecticut Turnpike, also offers the road builder a number of intermediate and low-cost types of asphalt construction for roads, streets, airports and parking areas. Helpful information on these types is supplied in two free Texaco booklets. Copies can be obtained with no obligation by writing our nearest office.



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